3dcreative

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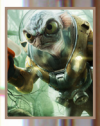
Issue 059 July 2010

Interview
Abraham Valdez



The Gallery
Fabricio Moraes, Tomáš Müller, Igor Catto & more!

Project Overview
"Mr Burns"
by Martin Beyer

FREE – Inside Look!
Digital Art Masters: Volume 4 Project Overview
by Loïc Zimmermann

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Cover Image | Environment Lighting | Scene created by Viktor Fretyán | Tutorial written by Jamie Cardoso

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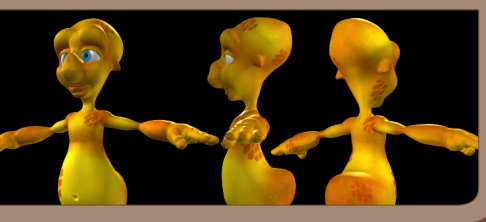
LIGHTING, MODELING, POSING, TEXTURING & RIGGING



Indoor Environment Lighting: Broad Daylight

Staying indoors **Viktor Fretyán**, **Jamie Cardoso**, **Luciano Iurino** and **Fredi Voss** return with chapter 2 of this Environment Lighting tutorial series.

How to Stylize and Model Toon Animals

Jose Alves da Silva brings us the second chapter of his wonderful **Stylizing a Toon Animal** tutorial series this month covering Posing & Texturing.

Mudbox Female Character Creation

Extreme Piercings & Tattoos is the subject of this month's **Mudbox Female Character Creation** tutorial series by Mudbox master **Wayne Robson** .

Creating Your Rig

In chapter 4 we continue and conclude our rig creation for the **Introduction to Rigging** tutorial series in 3dsmax & Maya.

Editorial

So we are passed the half way point of the year and I hope you are enjoying the hot summer weather and are ready for another packed issue of 3DCreative.

There is so much great content in this magazine I don't know where to begin. Maybe a good starting point would be this month's interview which is with the sublime character artist Abraham Valdez. Abraham has been churning out great artwork in forums that has been catching our eye for some time now, and this month we finally caught up with him for an interview. Abraham tells us about his route from being a traditional artist to creating characters for the new Medal of Honor game at EA Games in America.

Some of you will remember the human looking Mr. Burns from the cover of the April issue of 3DCreative. Well in this month's issue Martin Beyer tells us how he transformed a creepy Mr. Burns cartoon into an even creepier human looking version. Martin shows us how he captured the character of Mr Burns by perfecting his pose and how vital it is to have good reference images.

Richard Kazuo, Danilo Pinheiro and Luis San Juan Palleres take us one step closer to creating a finished Rig for our alien character. There are only two more chapters until the character is finished and the team at 3DTotal would love to see your animations, so send them in to me at simon@3dtotal.com.

We hope you all felt inspired by the excellent scene we are lighting in our indoor lighting tutorial. I think it is very appropriate that as we are enjoying the best weather of the year so far this issues subject matter is lighting a Broad Daylight scene. We continue the series featuring Jamie Cardoso in 3DS Max and Mental Ray, Viktor Fretyan in 3DS Max and V-Ray, Fredi Voss in Cinema 4D and Luciano Iurino in Maya and mental ray.

I am sure that you all enjoyed Jose Alves da Silva's first chapter of his Cartoon animal's tutorial. In this issue Jose shows us how he gave his kangaroo attitude with an expressive pose, and how he started to incorporate his background into the image. In next month's issue we will be wrapping up the series by looking at the texturing.

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If Mudbox is more your kind of thing, check out the latest chapter in Wayne Robson's female character creation series. In this issue Wayne shows us how to put piercings and tattoo's on our female character. Wayne has also prepared some more videos for us where we can not only learn about modeling in Mudbox but also enjoy listening to his great accent!

As if that wasn't enough our gallery features artwork from Igor Catto, Fabricio Moraes, Morteza Najafi and many more. Have fun!

Get the most out of your Magazine!

If you're having problems viewing the double-page spreads that we feature in this magazine, follow this handy little guide on how to set up your PDF reader!

Setting up your PDF reader

For optimum viewing of the magazine, it is recommended that you have the latest Acrobat Reader installed. You can download it for free, here: DOWNLOAD!

To view the many double-page spreads featured in 3DCreative magazine, you can set the reader to display 'two-up', which will show double-page spreads as one large landscape image:

1. Open the magazine in Reader;
2. Go to the View menu, then Page Display;
3. Select Two-up Continuous, making sure that Show Cover Page is also selected.

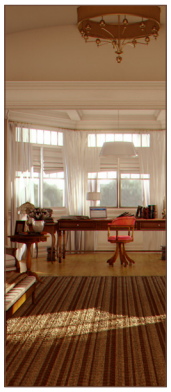
That's it!

Contributing Artists

Every month artists from around the world contribute to 3DCreative, and you can find out a little more about them right here! If you'd like to get involved in 3DCreative magazine, please contact: simon@3dtotal.com

Environment Lighting Indoor Scene

Chapter 2 of our new Environment Indoor Lighting tutorial series with a great lineup of talented artists: **Jamie cardoso** (**3ds Max + MR**), **Viktor Fretyán** (**3ds Max + Vray**), **Luciano Iurino** (**Maya**) and **Fredi Voss** (**Cinema 4D**).



Viktor Fretyan

Viktor Fretyan is an architect working on his diploma project whilst working as a freelancer. Viktor is doing mostly architectural renders and has never really tried out at any other fields of 3d yet. Viktor also has a passion for movies and maybe at some point will try working on VFX.

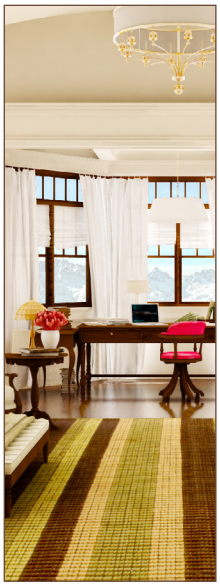
http://radicjoe.cgsociety.org/gallery/

radicjoe@yahoo.com

Luciano Iurino

Started back in 1994 with 3d Studio on MS-Dos as a modeller/ texture artist. In 2001 he co-founded PM Studios (an Italian videogame developer) with some friends, and still works for it as the lead 3D artist. He also works as a freelancer for different magazines, web-portals, GFX and videogame companies, and recently he left the 3ds Max environment to move on to XSI.

http://www.pmstudios.it | iuri@pmstudios.it

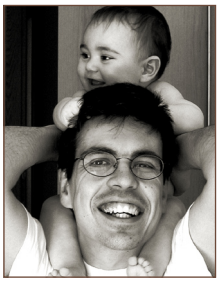


Fredi Voss

Living and working as a fine artist and 3D freelancer in Germany, Fredi – a.k.a. rollmops – can often be found on the various web communities, where he has also won several awards. His client list includes Audi and Siemens, and he also has as Animago Award and a Fine Art degree under his belt!

http://fredivoss.cgsociety.org/gallery/

vuuxx@gmx.de



Jose Alves da Silva

Jose Alves da Silva has been working in the 3D field for over 15 years. Jose started working mainly in Architectural visualization. Jose works as a full time freelancer dedicated to character creation and illustration. This has given Jose the opportunity to work on some spectacular projects in the feature film, advertising and gaming industries.

http://josealvessilva.daportfolio.com/

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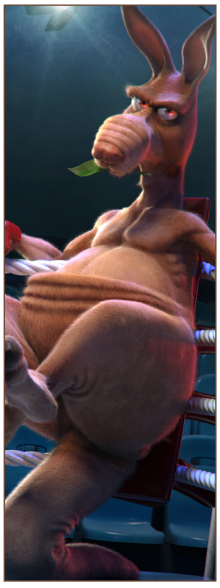
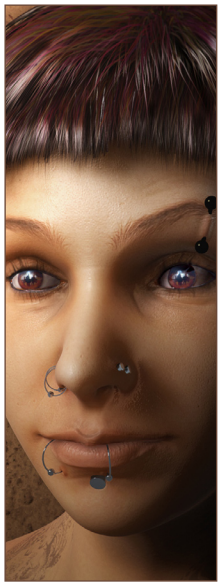
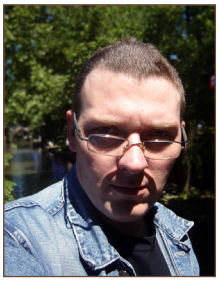




Wayne Robson



is a freelance digital artist who has taught Mudbox around the world and has been asked to lecture at the Vienna science academy. He is the programmer behind 'MudWalker' and the mental ray shader for vector displacement using Mudbox maps. currently he's works as a CGI supervisor for Project 2813. He owns Mudbox Hub and PsychoCore Software. www.dashdotslash.net

wayne@dashdotslash.net

Danilo Pinheiro

Danilo Pinheiro is a Brazilian with a Physics degree from UFMG. He worked for 5 years as a 3D generalist in films, advertising, arts, HQ, video clips, TV series, etc. After that, he is working as a Character TD, because he enjoys solving problems.

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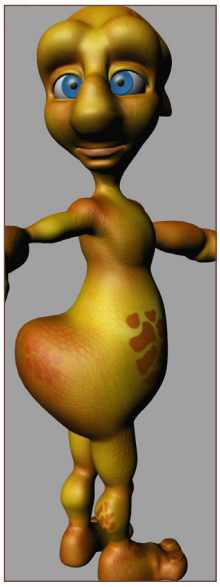

Luis San Juan Pallares

My name is Luis San Juan, I am a freelancer with over 9 years CG experience. I have worked as a character setup supervisor and created tools for the studios I worked at, such as Nexus Productions, Keytoon Animation Studios, Ilion Animation Studios and the Mill.

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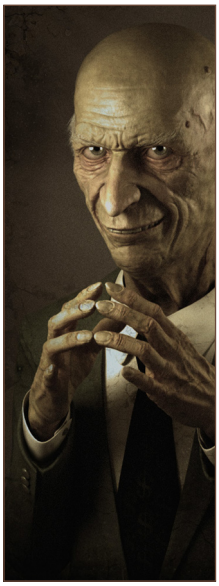
Martin Beyer

Martin Beyer is a 33 year old digital artist specializing in high and low resolution 3D character modeling and textures for video-game and movie productions. Martin was an airbrush-artist for about 15 years and started working as a 3D artist in 2008. Currently Martin is employed as a lead character modeler and 3D artist at ExDream entertainment in Hanover, Germany. http://monomauve.deviantart.com/

pitchepuck@t-online.de



Richard Maegaki

Born in Brazil, Richard Maegaki studied at Melies School of Cinema and Animation where he discovered a passion for rigging. After a brief time at Casablanca Animation as a Character Rigger, Richard was hired at Vetor Zero/Lobo and is working there as a Lead Character TD since 2007.

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Abraham Valdez

Abraham Valdez was born in Brooklyn N.Y. He graduated from the Art Institute of Fort Lauderdale and began his professional career soon after. Abraham has been a professional 3d artist in the computer animation industry since '98. Working in Broadcast, 2d Flash animation, Military based training and the gaming industry.

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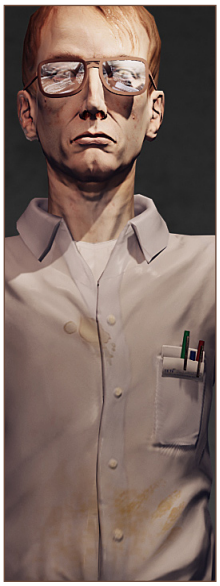

Would You Like to Contribute to 3DCreative or 2DArtist Magazine?

We are always looking for tutorial artists, gallery submissions, potential interviewees, 'making of' writers, and more. For more information, please send a link to your portfolio, or send examples, to: simon@3dtotal.com

Abraham Valdez

Abraham Valdez is an excellent character artist from Los Angeles. In this interview, Abraham tells us about his artistic evolution, from a tradition artist to a senior character artist at EA games in the USA, working on the next *Medal of Honor* game.

"When starting a project, make sure you complete it."

INTERVIEW WITH ABRAHAM VALDEZ

Hi, Abraham it's nice to meet you. You trained in traditional art at college, so how did you end up doing 3D?

Hello Chris it's nice to meet you too and I'd like to thank you for this opportunity. I think ultimately what lead me into 3D was the challenge of it all. The possibility of one day working on the next *Toy Story* or working on the next *Tekken* was extremely enticing. I didn't own a computer when attending college, so I knew the road wouldn't be easy. There is a lot to learn and understand before you can produce 3D art at any level. The challenges never cease; technology and new techniques are always being developed and implemented. It's a constant challenge that any artist who takes his career seriously needs to accept.

You've recently moved to the States to work for EA in Los Angeles - what was it about this particular company that made you want to work there, and what will be your position be?

The team at EA Los Angeles is comprised of film industry and game artists of the highest caliber. The individuals that influence your career the most are the people that sit around you and I'm fortunate enough to have been selected to be a part of the *Medal of Honor* team. The franchise has already been successful but we're all looking forward to starting a new era in the *Medal of Honor* series. The position I currently hold is Senior Character Artist.

"WHEN DOING A PERSONAL PROJECT I LIKE TO GET INVOLVED WITH THE CHARACTER I'M CREATING..."

You've created some cool looking characters; which has been the most interesting of these to create? And also which has been the most challenging?

The most interesting character I've created is the Son of Nimlot. I spent countless hours researching American Indian culture and even visited a Seminole tribe in Florida. (www.ahtahthiki.com) When doing a personal project I like to get involved with the character I'm creating, and it makes the completion that much more satisfying. Every character has its own challenges and I like to determine what will be the most challenging part of each character and focus my attention on that. Overall the most challenging undertaking has been, and I'm sure always will be, making beautiful females.

So what sparked your interest in the American Indian culture which then led you to creating this character?

I have a library of projects that have yet to be started. The American Indian culture has always intrigued and fascinated me, and I felt the time was right for this project to be developed. With my projects there isn't a moment that sparks my interest, but more a series of events that eventually triggers the action. A good movie or game can motivate you but it usually takes more than one moment of inspiration to create a character. When the desire is overwhelming and the character must come to life, then I begin. Personal work should be that: personal and meaningful.

What programs do you use to create your characters, and also how long on average would you spend on a model?

I use 3ds Max, ZBrush and Photoshop primarily.

On average I spend a week or two depending on the level of detail and how many assets can be kit-bashed. It also substantially depends on if I have all the necessary references for modeling or texturing.

So what is your opinion of ZBrush? Some artists seem to love it whereas others seem to hate it!

Preference in software packages will always be based on the individual; the only certainty is that the end result is what matters most. Most of the knowledge an artist gains from using a particular piece of software can be transferred to another package, but the quality of the art should remain the same. I use ZBrush and am most impressed by the team at Pixologic. They're constantly updating the software and adding new tools. ZBrush changed the quality and the length of time it takes to develop characters and so I fall into the category of artists that love ZBrush.

What has been the most constructive piece of advice you've been given and by whom?

"When starting a project make sure you complete it. You don't want to get into the bad habit of not completing projects." Recently

though I've started sketching out ideas and not completing them, but I'm not sure if that counts; it's not "really" a project if I don't at least have a design and a set direction. This gem of advice was given to me by a programmer and it's pretty much a rule of conduct now.

Having to sit all day in front of the computer screen is hard on your eyes as well as your back, so occasionally we here in the office take time out and play a bit of table tennis. What sort of things do you do to help break up the day?

I used to work close to the local batting cages. Every so often on my lunch break I'd go to the cages and swing the bat.

Well Abraham it was a pleasure chatting with you today and I wish you all the best at EA. One last question before we wrap this up: if you were given a brief to create a character of yourself (having full rein to exaggerate anything to fit your personality), what would it be like?

My character would chew tobacco and that would link him to my other passion: baseball. The game would be called "That's our Abe!" and I'd have the ability to HULK OUT at any point in the game and for any reason. Anatomically I would model the character with an Iron Fist and a crown. I'd give him a Steven Seagal ponytail, a big heart and a Brooklyn Dodgers hat with a Yankees jersey.

ABRAHAM VALDEZ

For more work by this artist please visit:
http://www.abrahamvaldez.com
Or contact them at:
avaldez@abrahamvaldez.com
Interviewed by: Chris Perrins

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Morteza Najafi

Tomáš Müller

David Arberas Recondo

Martin Demovic

Raphael Baldini

Fabricio Moraes

Anto Juricic

Moises Gomes

Igor Catto

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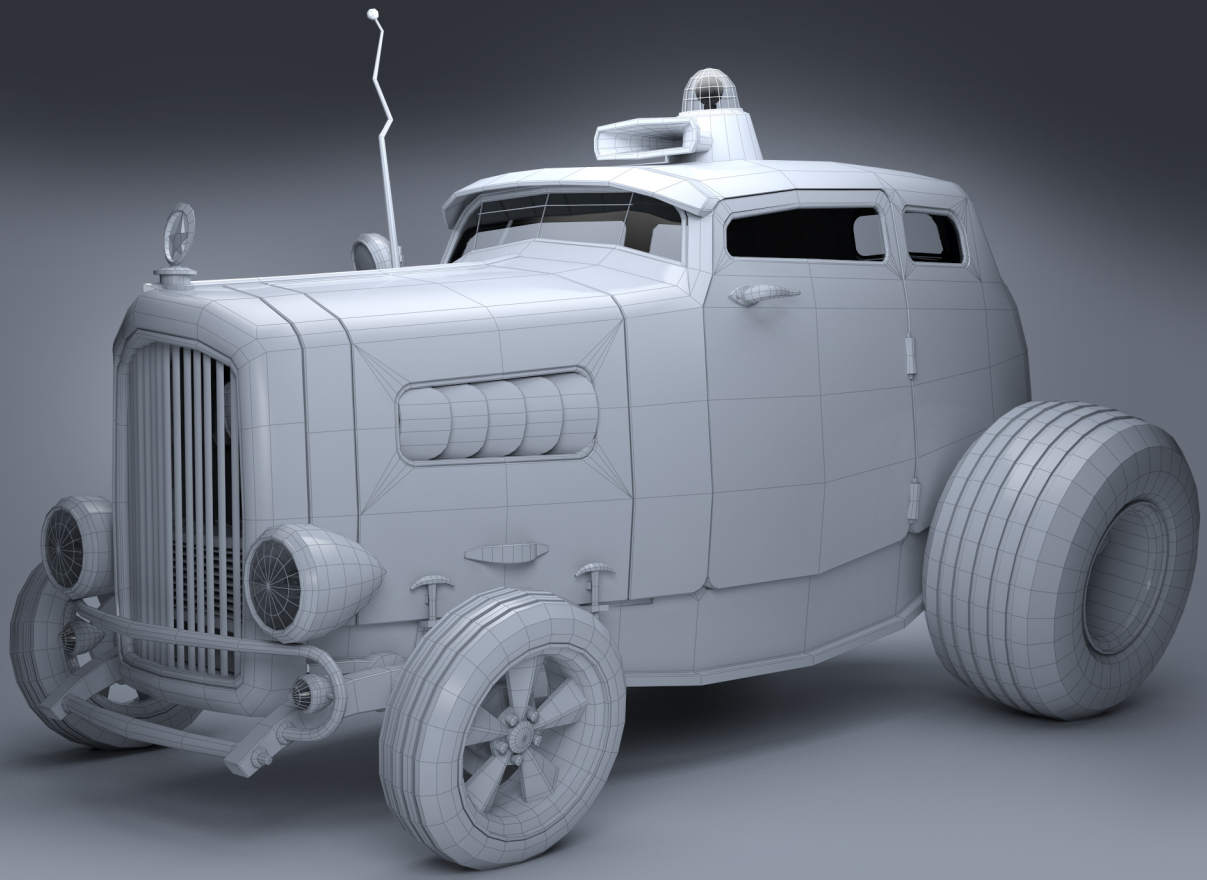
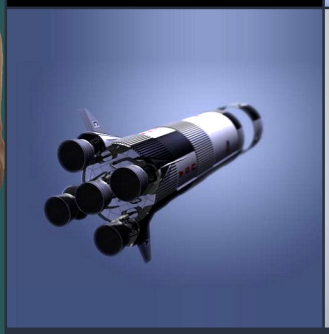


Premium 3D Objects and Textures





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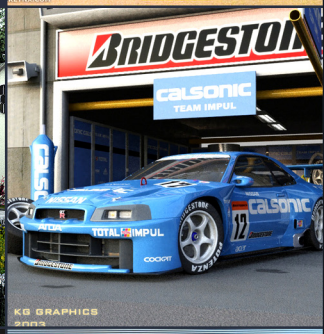



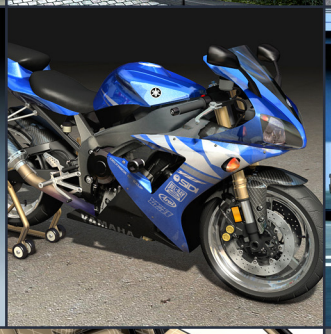
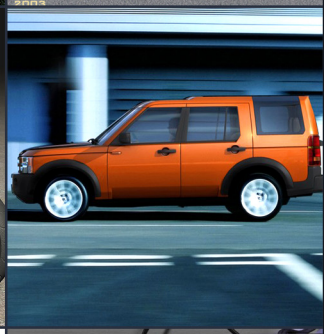

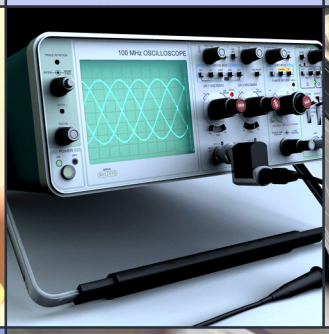




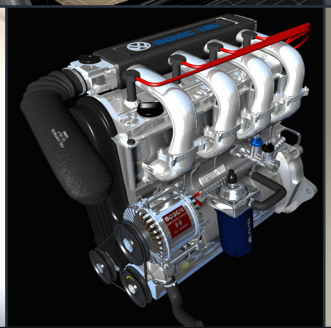


FOLLOW THIS TUTORIAL SERIES ON PAGE 106

Environment Lighting

This five part series will focus on the topic of setting up a variety of lighting rigs that reflect natural lighting at different times of the day and manmade interior lighting. Each of the chapters will use the same base scene as a starting point, and will show a step by step guide to finding a lighting and rendering solution that best reflects the desired lighting situation.

The tutorials will explain the type of lights used and how to set up the parameters along with talking about the different methods of tackling the subject. The manipulation of textures may also be covered in order to turn a daylight scene into night scene for example, as well as a look at some useful post production techniques in Photoshop in order to enhance a final still.

Follow

This month our artists will show you how to turn our seemingly boring scene into a truly atmospheric environment with the first chapter covering Broad Daylight.

So if your interested in seeing the first chapter of this amazing series, please flip to the back of this magazine and enjoy.

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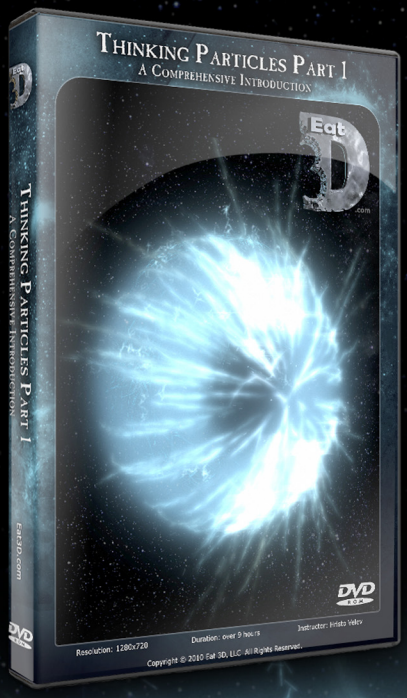
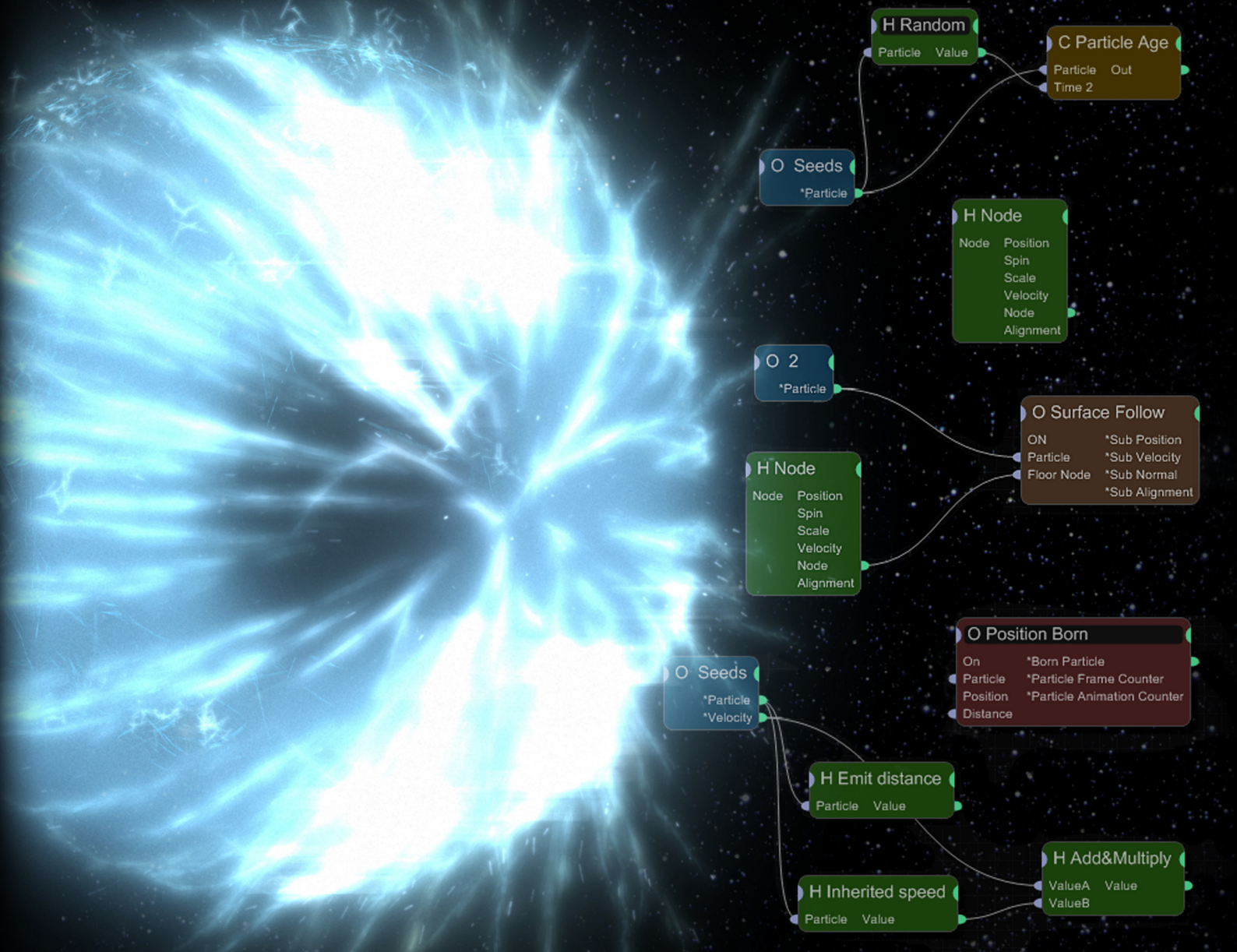


Hristo Velev (VFX Artist who worked on the movie '2012') starts from the beginning by explaining what Thinking Particles actually is, and then begins to build on a solid foundation of theory and technical knowledge. Then Hristo goes through the entire process of creating a complete project from start to finish to help you understand a proven pipeline in creating amazing effects.



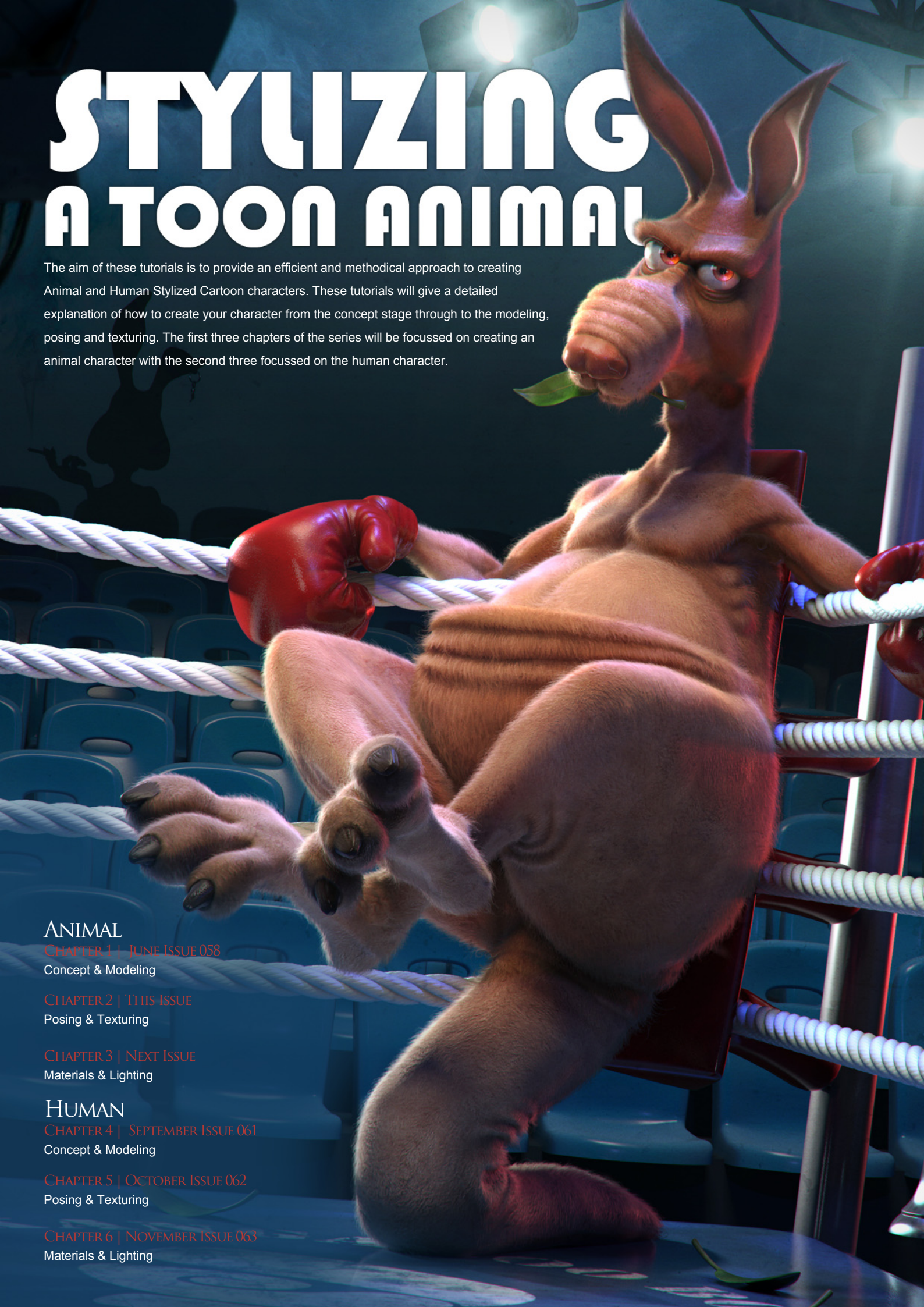
Thinking Particles Part 1 - An Introduction

Hristo Velev - VFX Artist

eat3d.com

STYLIZING A TOON ANIMAL

The aim of these tutorials is to provide an efficient and methodical approach to creating Animal and Human Stylized Cartoon characters. These tutorials will give a detailed explanation of how to create your character from the concept stage through to the modeling, posing and texturing. The first three chapters of the series will be focussed on creating an animal character with the second three focussed on the human character.



Animal

Chapter 1 | June Issue 058
Concept & Modeling

Chapter 2 | This Issue
Posing & Texturing

Chapter 3 | Next Issue
Materials & Lighting

Human

Chapter 4 | September Issue 061
Concept & Modeling

Chapter 5 | October Issue 062
Posing & Texturing

Chapter 6 | November Issue 063
Materials & Lighting

How to Stylize and Model 'Toon Animals' Chapter 2 - Posing & Texturing

Software used: 3ds Max & ZBrush

Introduction

In Chapter One we covered sketching and creating a high resolution model of our Boxing Kangaroo character. In this second chapter we will start to bring our character to life by giving him an attitude and some color!

We will pose the character, work on his expression and finally paint him. Then In Chapter 3 we will deal with the aspects of material creation and lighting.

Pose

When presenting our concept, the T-pose is not very appealing to the viewer. It is great for rigging and working the symmetrical aspects of a character, but it doesn't suggest anything about his personality. As mentioned in the previous chapter, think of the tutorial as a suggestion rather than something mandatory.

I will try to follow the attitude that I put into the character sketch (**Fig.01**). My kangaroo is cocky and confident in his boxing skills, defying us with his look, just waiting for an excuse to start a brawl. I will keep the detail of having him chewing a leaf, as it is typical of kangaroos and it adds to his defiant, self-confident attitude.

Kangaroo's rely on their tails for support, so let's take that and turn it into something comic by making him sit on his tail as if he was in the corner bench of a boxing ring. To reinforce this idea of cockiness I will change the upper body position, making him lean against the ring corner. I also think that his arms will transmit more confidence if they are open and supported by the ring's ropes in a relaxed pose.

As the character is interacting with the environment we have to start by creating some temporary props that will guide us with the posing. We will create a box representing the corner and a few cylinders for the ropes.

Exporting references to 3ds Max

We will start by exporting a low resolution version of our kangaroo to 3ds Max in order to provide us with a reference to create the corner (**Fig.02**).

- In ZBrush, make sure that you have the Kangaroo body subtool selected and lower the geometry subdivision level to two in the Geometry pull down.
- Press the Export button in the Tool menu.
- Make sure the file format is OBJ.
- Save the file as "kangaroo2.obj".

Import to 3ds Max (**Fig.03**)

- Open 3ds Max.
- Select the Import option under the File menu.
- Pick the exported file (kangaroo2.obj).
- The OBJ Import Options menu will pop up.

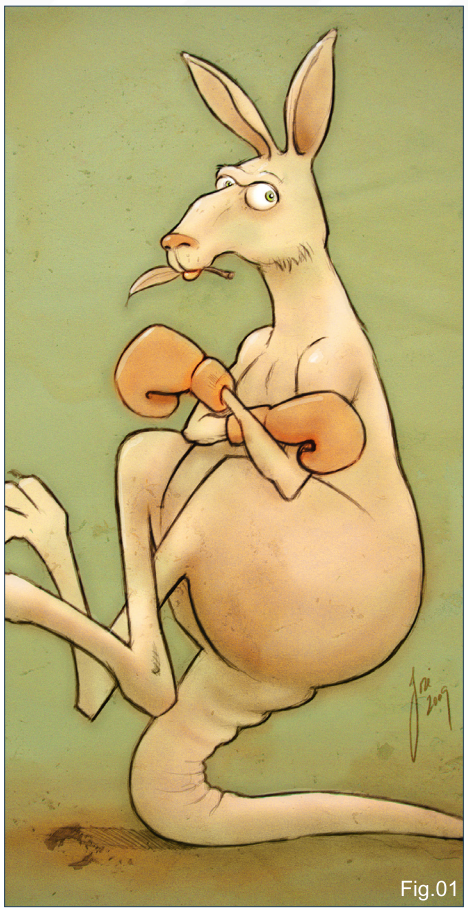


Fig.01

- At the bottom of the menu change the preset to ZBrush.
- Enable the Import As Single Mesh option.
- Enable the Convert option under Units/Scale and make sure the Model Units are set to Meters.
- Under Material, disable the Import Materials option.
- Click Import.

You should now have a low resolution kangaroo with the correct scale.

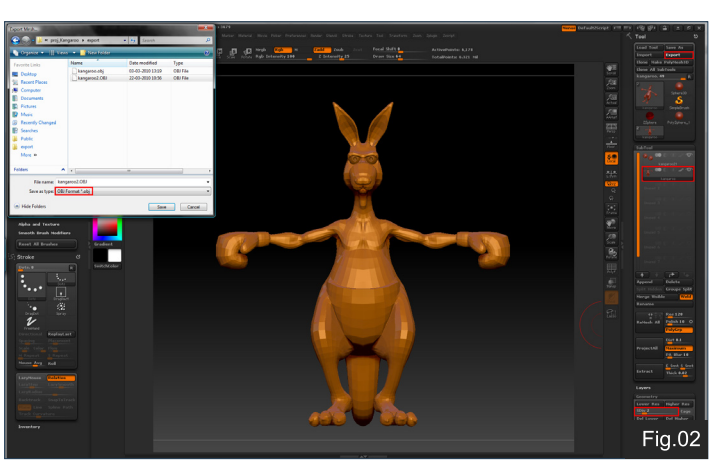


Fig.02

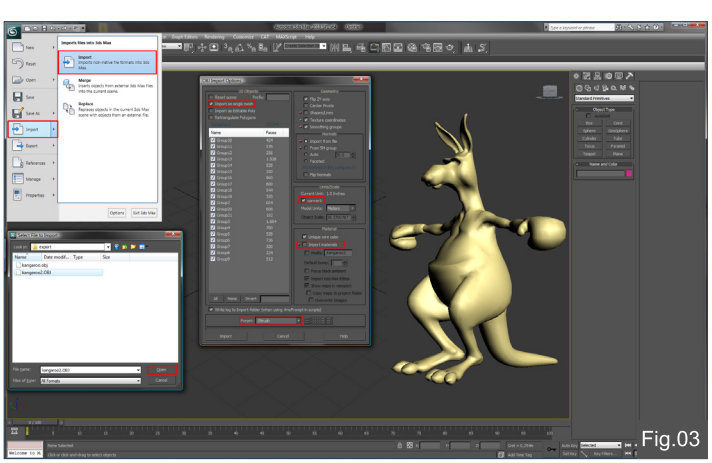


Fig.03

Ring Pad (**Fig.04**)

- In the Create menu choose Extended Primitives from the pull down menu (instead of Standard Primitives).
- Choose ChamferBox.
- Create a ChamferBox in the top view behind the kangaroo. It can intersect his tail.
- Use the following parameters for the ChamferBox: Length 0,15m, Width 0,35m, Height 1,5m, Fillet 0,027m, Length Segments 1, Width Segments 3, Height Segments 12, Fillet Segments 2.

We have segmented the pad so that it is uniformly divided. This will result in a uniform subdivision, which is a good base for sculpting.

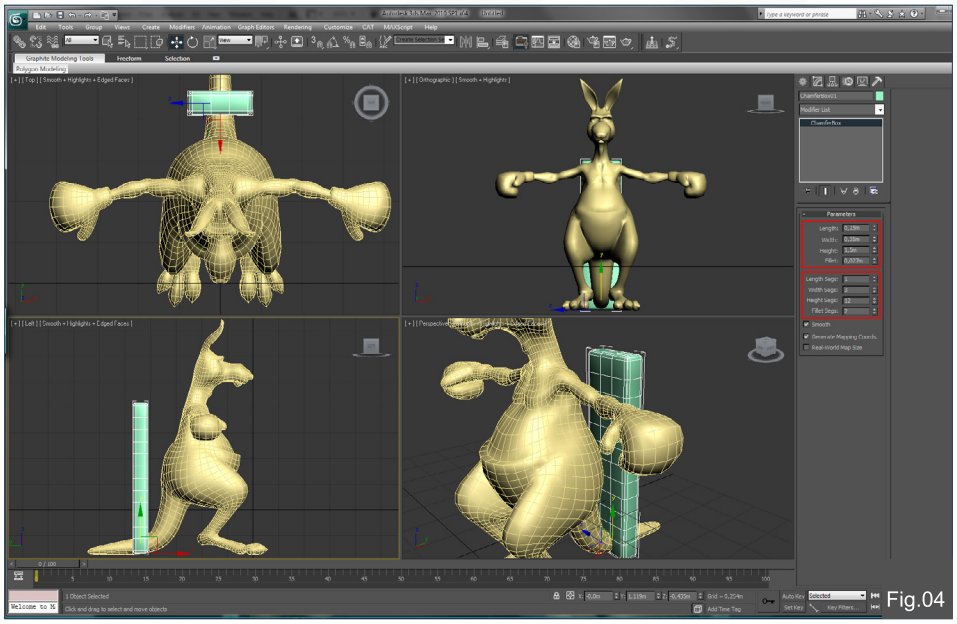


Fig.04

Ring Ropes 1 (**Fig.05**)

- In the Create menu choose Standard Primitives from the pull down menu.
- Choose Cylinder.
- In a side view create a cylinder with the following parameters: Radius 0,025m, Height 4,0m, Height Segments 1, Cap Segments 1, Sides 12.
- In the side view, Shift + Drag the cylinder along the Y axis. At the bottom of the screen there are three axis coordinates. As you drag you will see the Y value updating; when it reaches a value of about 0,25m release the mouse button. The Clone Options window will pop up.
- Under Clone Options, increase the number of copies to three. Select OK.

You have cloned the cylinder three times, evenly spaced at distances of 0,25m.

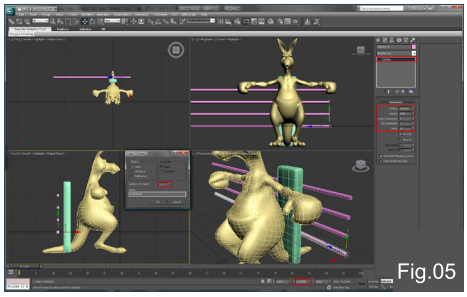


Fig.05

Ring Ropes 2 (**Fig.06**)

- Select the four cylinders.
- Make sure Angle Snap is on (Press A to toggle).
- In the top view rotate the cylinders 45 degrees.
- Press Shift and rotate the cylinders 90 degrees to clone them perpendicularly.

Ring Ropes 3 (**Fig.07**)

- Move the cylinders so that they come out of the ChamferBox sides.

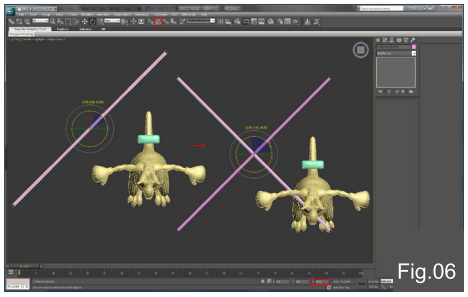


Fig.06

Export 1 (**Fig.08**)

- Select the cylinders and chamfer box.
- Go to File > Export > Export Selected.
- Change the file type to OBJ and save with the name “ring.obj”.
- In the OBJ Export make sure the ZBrush preset is selected.
- Change the Scale to 0,025
- Click Export.

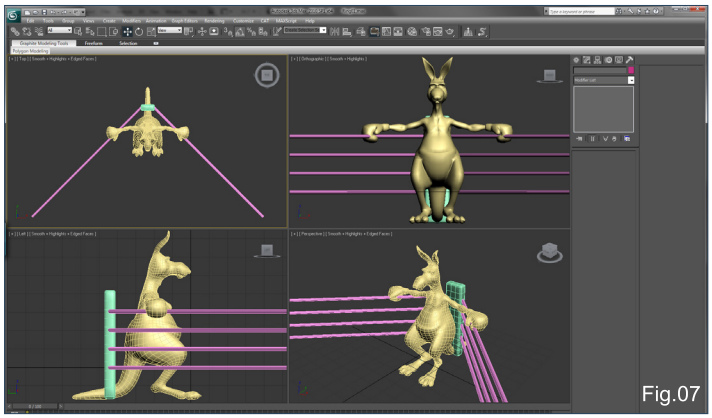


Fig.07

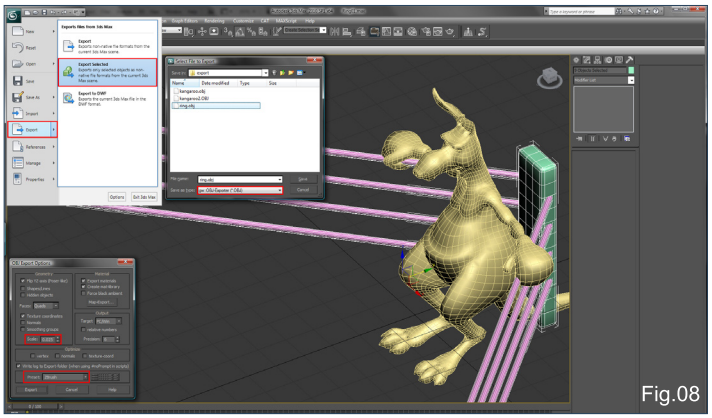


Fig.08

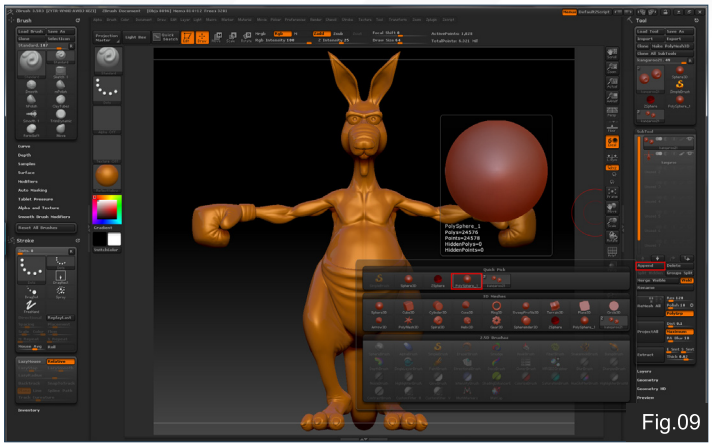


Fig.09

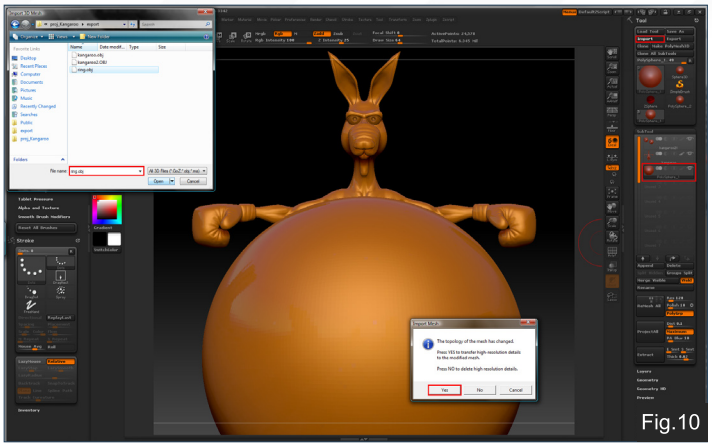


Fig.10

Export 2 (**Fig.09**)

In ZBrush we will import the ring by appending a polysphere to the kangaroo tool and replacing it with the imported ring.

- In the Tool menu click Append in the Subtool pull down.
- From the Quick Pick window choose "PolySphere_1".

Export 3 (**Fig.10**)

- Choose the new PolySphere_1 subtool.
- Go to Tool > Import and choose the "ring.obj" file.
- A pop up will show up, press Yes.

The ring is now imported and with the correct scale.

NOTE: If you have any issues regarding the scale of the ring while importing (I have already had some quite weird experiences), just scale it using the Transpose tool. It is not very important to be very accurate as this ring is just a guide for the placement of the character and will be replaced by new models at the end of this chapter.

Transpose Master (**Fig.11**)

IMPORTANT: Before proceeding, go to the Tools menu and under the Layers pull down, create a new layer and name it "Pose". It is very important to keep all the pose changes in a new layer so that we can go back to the T-pose whenever needed.

When you work with the transpose tool, you can only affect one subtool. However, there are situations in which you want to be able to transpose several subtools at the same time. In our case, we want to move the head at the same time as the eyes. In order to be able to do this, ZBrush has the Transpose Master tool which will momentarily attach the subtools for the transpose operations.

- Go to the Zplugin menu.
- Click on Transpose Master.
- Click on TPoseMesh.

Now all the subtools are momentarily attached at its lowest subdivision.

Placing the character 1 (**Fig.12**)

We have to mask the ring, in order to only affect the kangaroo.

- Ctrl + Shift + left click the ring object.
- Ctrl + left click the background to mask the ring
- Ctrl + Shift + left click the background to un-hide the kangaroo.

We will rotate and position the back of the kangaroo against the pad.

- Choose Rotate mode at the top bar.
- Click + drag from the center of the body and up to place the Transpose tool.
- Rotate the character by dragging the inner

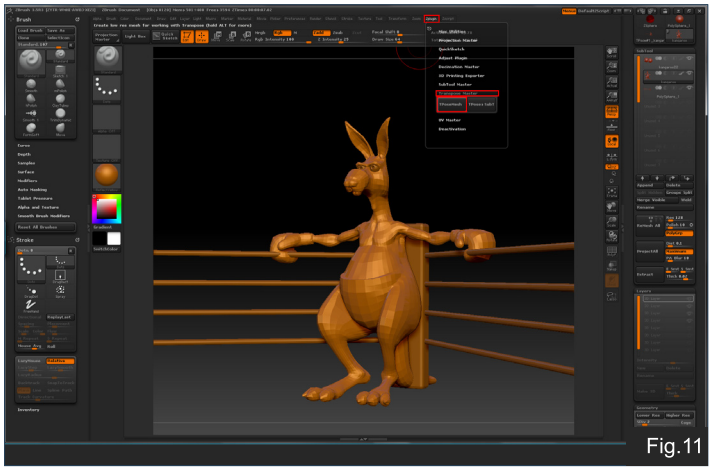


Fig.11

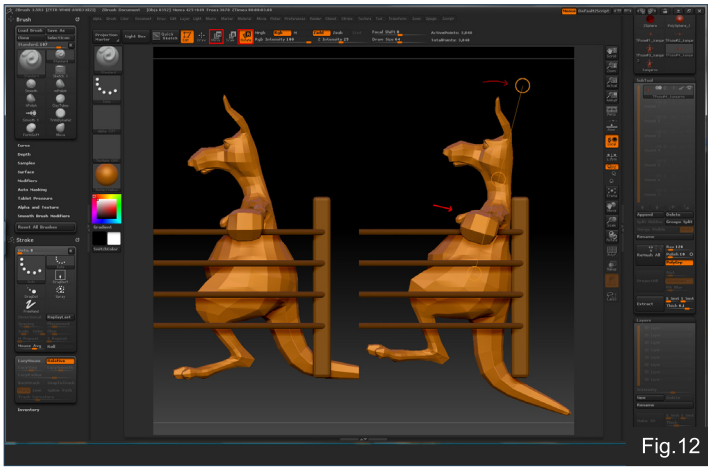


Fig.12

circle of the top handle of the Transpose tool.
- Choose Move mode at the top bar.
- Dragging the inner circle of the center handle of the Transpose tool, move the kangaroo until his back is against the pad. Also lower him a bit so we can rest his elbows on the ring's ropes.

From now on, I will assume that you know how to use the Transpose tool and will no longer describe how to Move and Rotate using the tool.

Placing the character 2 (**Fig.13**)

- Make sure you are in a side view (Drag with the left mouse button on the background while holding Shift until you have a side view).
- Ctrl + drag on the background to clear the mask selection.
- Ctrl + drag a window over the head to mask it.
- Ctrl + left click on the background to invert the selection.
- Ctrl + left click at the mask transition between head and body to smooth the mask.
- Using the Transpose tool in Rotate mode, place one of the tool's ends at the base of the neck and rotate the other end to make his head more horizontal.

Placing the character 3 (**Fig.14**)

We will exit Transpose Master.

- From the Zplugin menu, under Transpose Master, click the T-pose > SubT button.

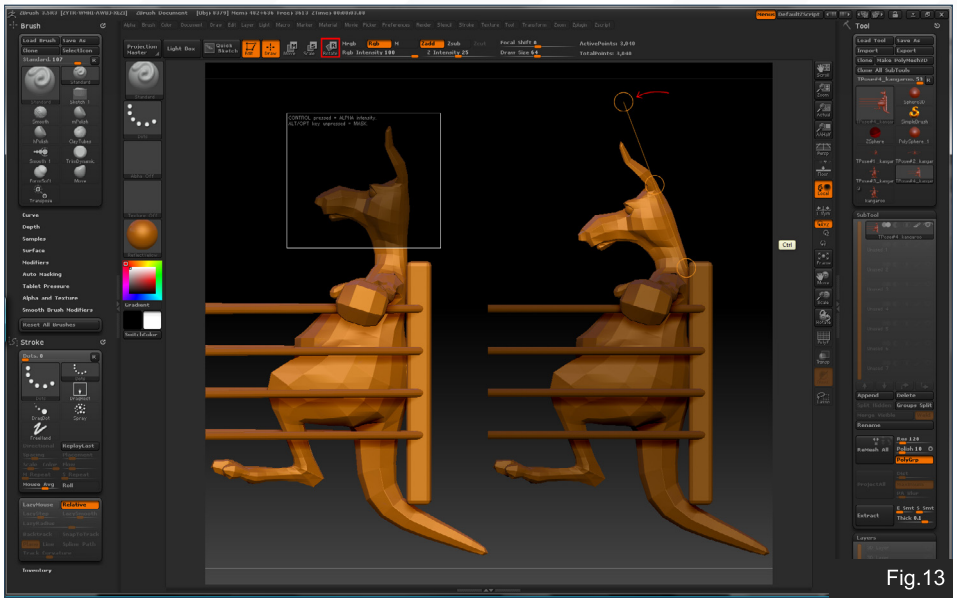


Fig.13

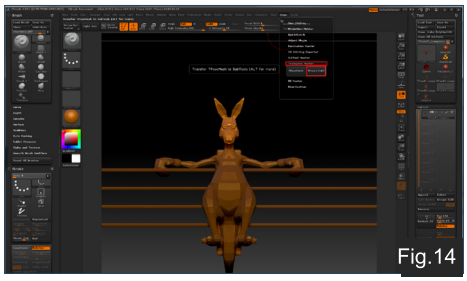


Fig.14

All the changes we have made will be transferred to the original model.

Posing the character 1 (**Fig.15**)

Make sure that we are at geometry subdivision level two.

- Select the Lasso tool as the selection mode (Ctrl + Shift + M).

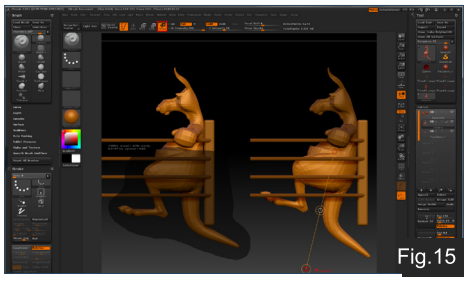


Fig.15

- Ctrl + drag with the left mouse button starting on the background and selecting the lower body area of the character (See **Fig.15**).
- Ctrl + left click on the background to invert the selection.
- Ctrl + left click at the mask transition between head and body to smooth the mask. Do this twice to make the transition really smooth.
- Use the Rotation Transpose tool to rotate the lower body forward by placing the center of rotation at the center of the body.

Posing the character 2 (**Fig.16**)

We will pose the tail as in the concept, supporting the weight of the character.

- Clear the mask selection.
- Ctrl + Shift + left click on the tail. This will isolate the tail as it has its own polygroup.
- Ctrl + click on the background to mask the tail.
- Ctrl + Shift + left click on the background to un-hide all.
-Ctrl + click on the background to inverse the mask selection.

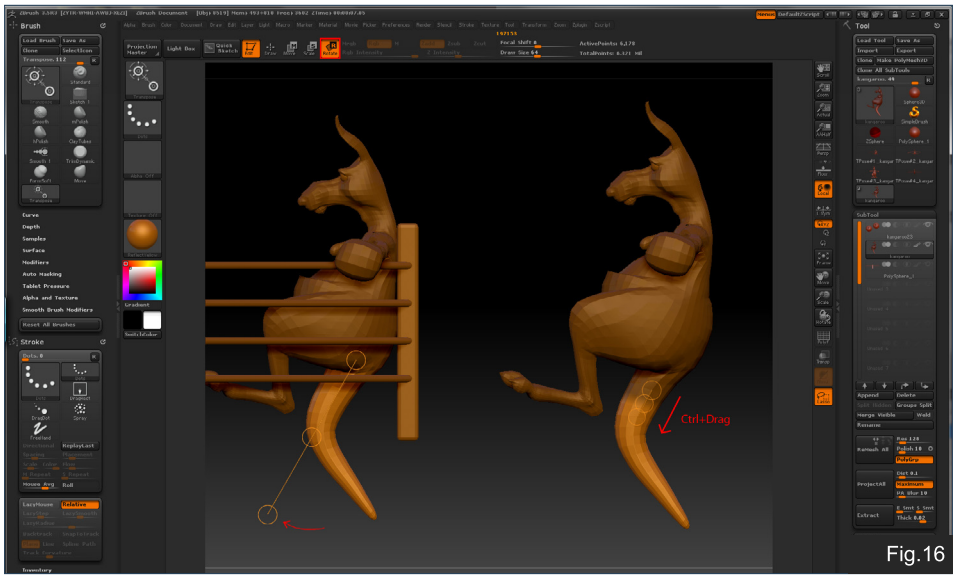


Fig.16

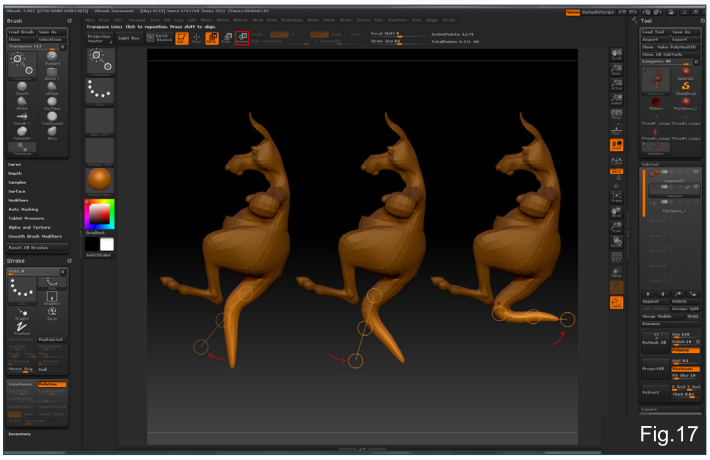


Fig.17

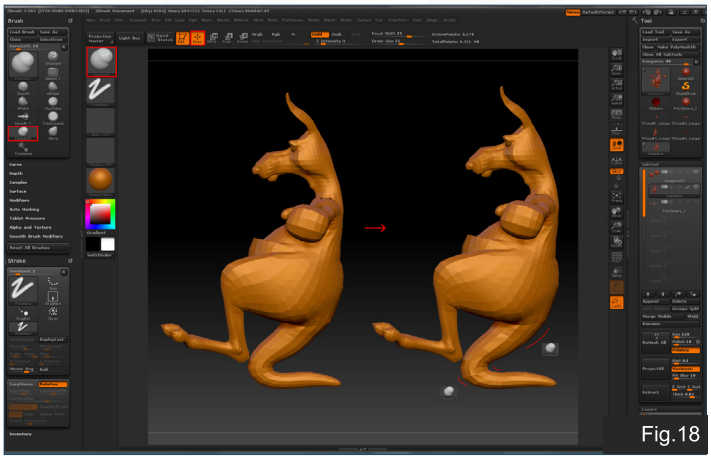


Fig.18

- Ctrl + left click at the mask transition between head and body to smooth the mask.
- Use the Rotation Transpose tool to rotate the tail inwards.

Now we will use another way to select the tail.

- Make sure that you are in the Rotate Mode (this doesn't work in Draw mode).
- Ctrl + drag, starting at a higher part of the tail towards the end of the tail. This will make a selection of part of the tail (See **Fig.16**).

Posing the character 3 (**Fig.17**)

Use the selection mode described previously and the Transpose Rotation tool to bend the tail. Then alternate between selecting parts of the tail and the Rotation tool to shape the curve of the tail.

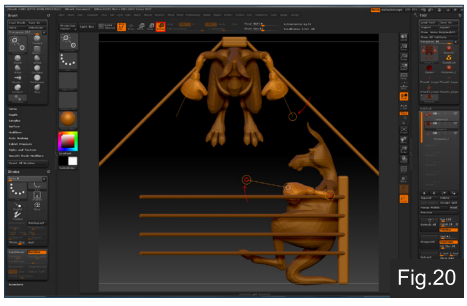


Fig.20

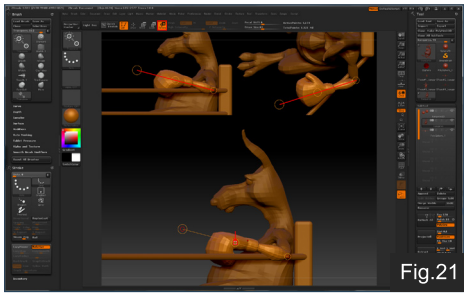


Fig.21

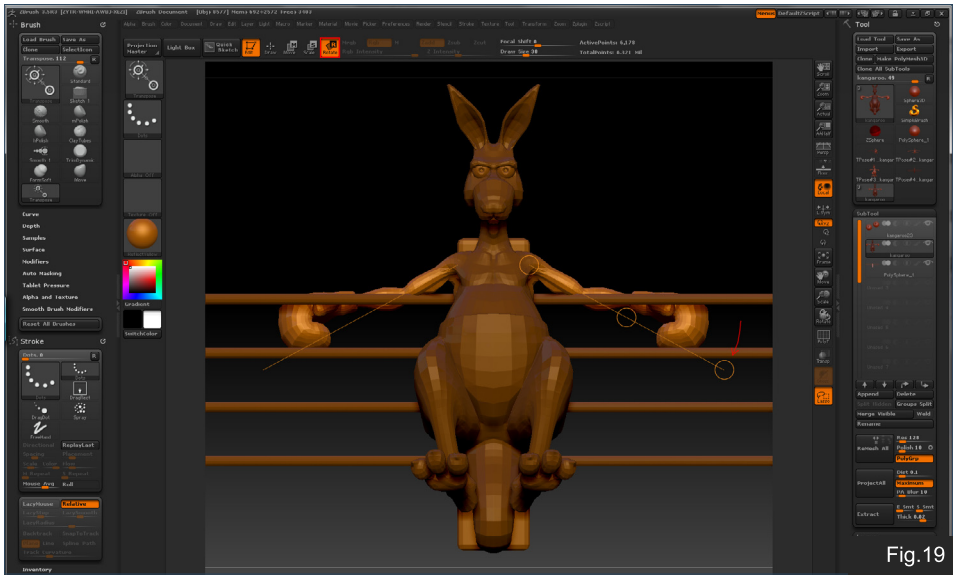


Fig.19

Posing the character 4 (**Fig.18**)

While posing the model, you will notice that some problems might happen in the deformed areas. Some parts of the tail have lost volume and look squashed.

- In Draw mode, select the FormSoft brush and paint the areas to which you need to add volume. The FormSoft brush adds volume without destroying the detail on the surface.

Posing the character 5 (**Fig.19**)

- Change to the front view
- Mask everything with the exception of the arms and gloves (Hide the polygroups of the arms and gloves and mask the visible part of the model, then un-hide all).
- Smooth the mask transition (Ctrl + click on the mask transition).
- Create a Rotation Transpose tool starting at the shoulder and along the arm.
- Rotate the arm until the elbows touch the ropes.

Posing the character 6 (**Fig.20**)

- Mask everything except the forearm and gloves.
- If necessary, to fine-tune the mask, paint on the surface with the Ctrl key pressed or Ctrl + Alt to erase the mask.
- In the top view, with the Rotation Transpose tool, and the origin of the rotation placed at the elbow, rotate the forearms inwards.
- Change to a side view.
- Create a Rotation Transpose tool with the origin at the elbow.
- Rotate the forearm upwards so that it doesn't intersect the rope.

Posing the character 7 (**Fig.21**)

Until now we have made rotations that are parallel to the screen. However, now we will need to twist the forearm and for that we have to line up the Transpose tool with the forearm in 3D space.

- In a side view create a Transpose tool that starts on the elbow and with a direction along the forearm.
- Change to a top view, and move the Transpose tool handles (by dragging the exterior circle of the handles) so that one is at the elbow and the other defines a direction along the arm.
- Orbit around the model to be sure that the Transpose tool line is perfectly lined up with the forearm.
- Click + drag on the inner circle of the central handle of the Transpose tool (while in Rotate mode) to twist the forearm until the palms of the gloves face downwards.

Posing the character 8 (**Fig.22**)

- Mask everything with the exception of the gloves. Also mask the part of the glove that covers the wrist by painting the mask.
- Place the Transpose tool with the rotation center over the wrist area.
- In top view rotate the hands slightly inwards.
- In side view, rotate the hands down, so that the character looks relaxed.

Posing the character 9 (**Fig.23**)

- Hide the polygroups of thighs, legs and feet.
- Mask the visible part of the model.

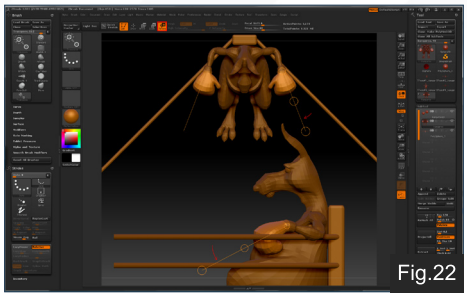


Fig.22

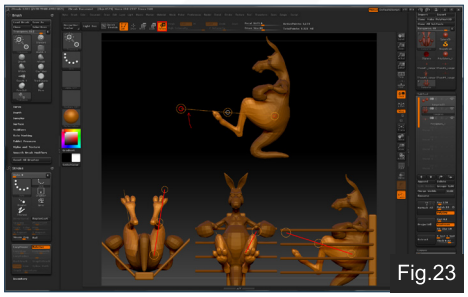


Fig.23

- Un-hide all.
- Smooth the mask twice by Ctrl + clicking on the mask transition.
- With the Rotation Transpose tool, center at the hip and rotate the legs up.
- Align the Transpose tool from several views so that one handle is at the hip and the direction of the tool aligned with the thigh bone.

Posing the character 10 (**Fig.24**)

We will start posing the crossed legs

- Drag on the inner circle of the central handle to twist the legs.
- Twist them inwards so that both ankles intersect.

Posing the character 11 (**Fig.25**)

So far, we have posed everything symmetrically. Now it is time to work on things that cannot be symmetrically posed.

- Press the X key to deactivate the symmetry function.
- Enable the PolyF button (Shift + F) to see the polygroups.
- Ctrl + Shift + click on the thigh.

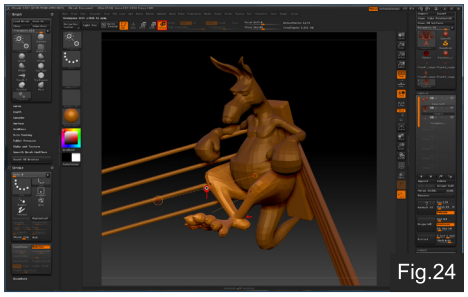


Fig.24

Both thighs are in the same polygroup. We will separate them in different polygroups:

- In the Tool menu, under Polygroups, click on Auto Groups.

Now each thigh is a different polygroup. Repeat the same operation for the remaining parts of the leg, including the feet and toes. With this polygroup separation we can now select each of the legs independently.

Posing the character 12 (**Fig.26**)

- Mask all the body with the exception of the left leg from the knee down.
- Smooth the mask by Ctrl + clicking on the mask transition.
- Place the Transpose tool, starting at the knee and along the lower leg.

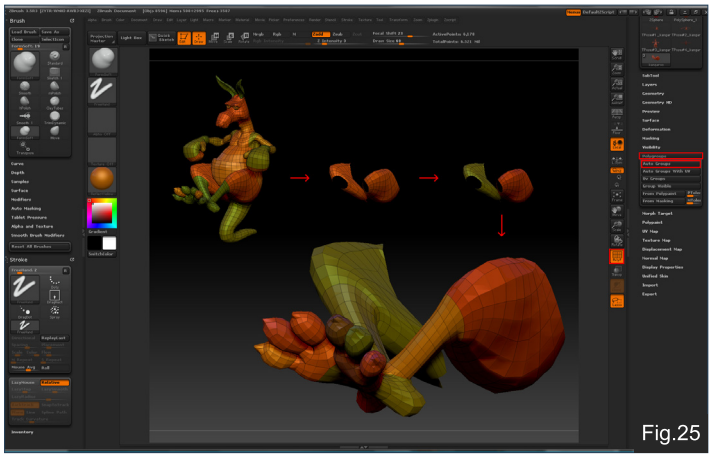


Fig.25

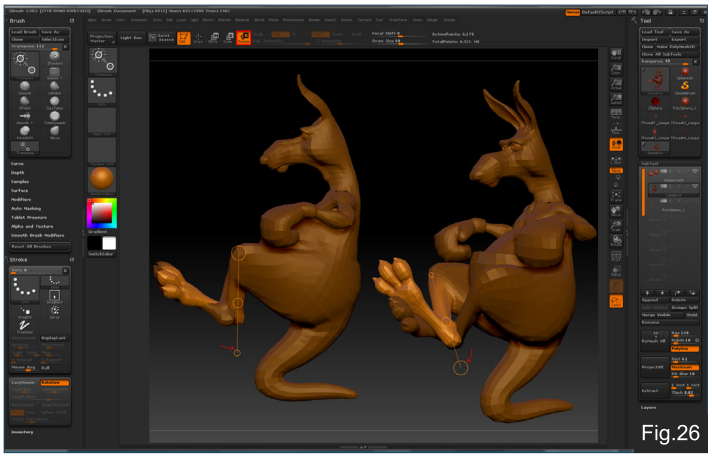


Fig.26

- Rotate the lower leg inwards.
- Repeat the same procedure for the right lower leg and rotate it outwards to avoid overlapping the other leg. You can also twist it a little.

Posing the character 13 (**Fig.27**)

- Mask everything except the right foot.
- Smooth the mask once
- Create the Transpose tool starting at the heel and in the direction of the toes.
- Change your view so that you see the foot from the side.
- Rotate the foot down.
- Mask everything except the tip of the foot.
- Create the Transpose tool starting at the ball of the foot and in the direction of the toes.
- Rotate the toes down.

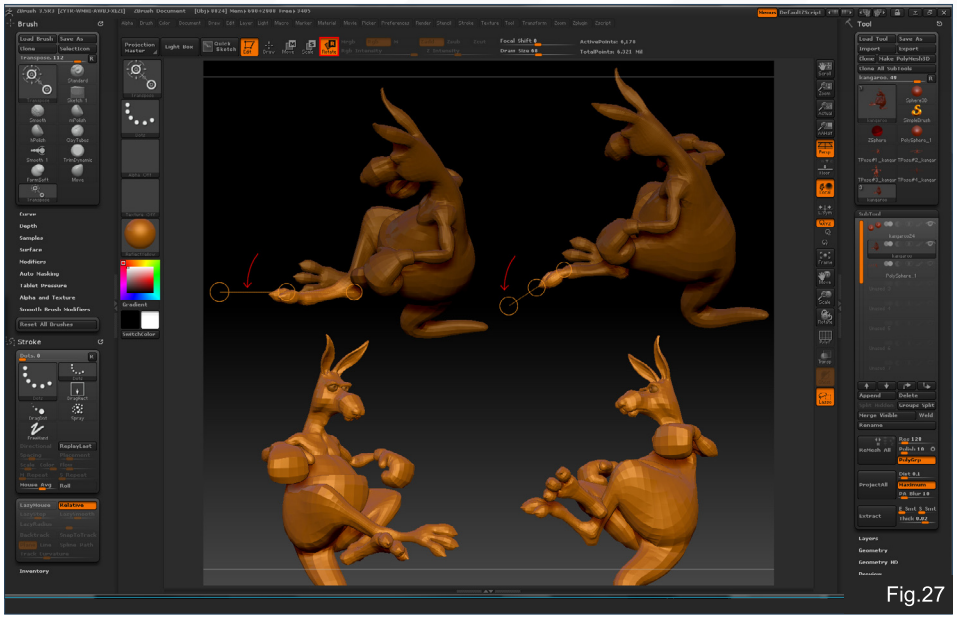


Fig.27

Do the same for the other foot. Try to give a relaxed look to the feet.

Posing the character 14 (**Fig.28**)

We will use the Transpose Master again now.

- From the Zplugin menu choose Transpose Master.
- Press TPose Mesh.
- Mask everything except the head.
- Using the Transpose tool, rotate the head a bit to the side and forward to add some expression.
- Go to Transpose Master > T-pose > SubT

Posing the character 15 (**Fig.29**)

Let's rotate the eyes so that we have a better idea of the character's expression.

- Select the subtool for the eyes.
- If active, disable the symmetry editing by pressing X.
- Mask one of the eyes.
- Create a Transpose tool with one of the ends at the center of the eye sphere.
- Rotate the eye.
- Repeat the procedure for the other eye.

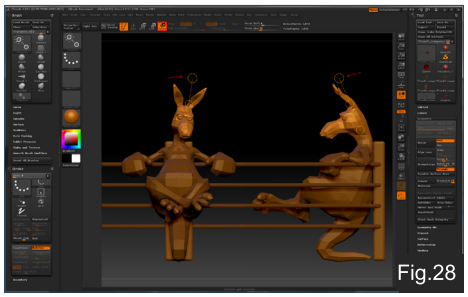


Fig.28

The character immediately looks more expressive.

Fine tuning 1 (**Fig.30**)

As we have introduced a lot of rotations to the mesh, it is expected that some joints might have some undesirable deformations. Raise the geometry subdivision level to the maximum and check areas like the elbows, the shoulders, the groin, the knees and the tail.

In my case, I have some ugly deformation marks at the tail (see **Fig.30**), I am also not happy with the flow of the tail in relation to the body mass. I will start by fixing the tail.

To fix the ugly deformations seen on the image it is quite simple.

- Go to Geometry subdivision level three.
- Use the Smooth brush (press Shift while using any other brush) over the entangled area.

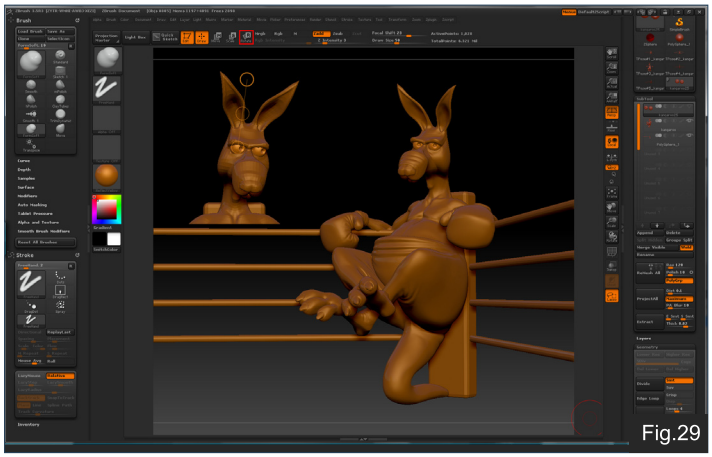


Fig.29

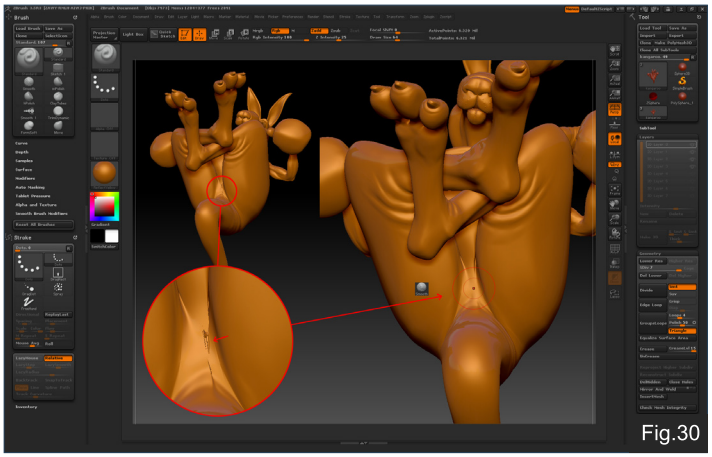


Fig.30

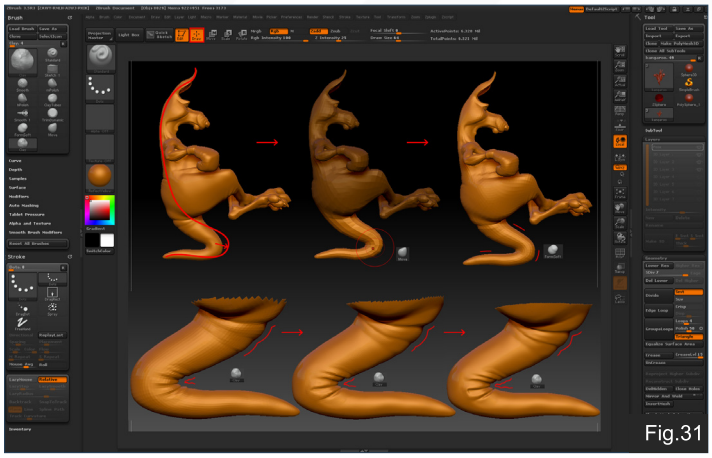


Fig.31

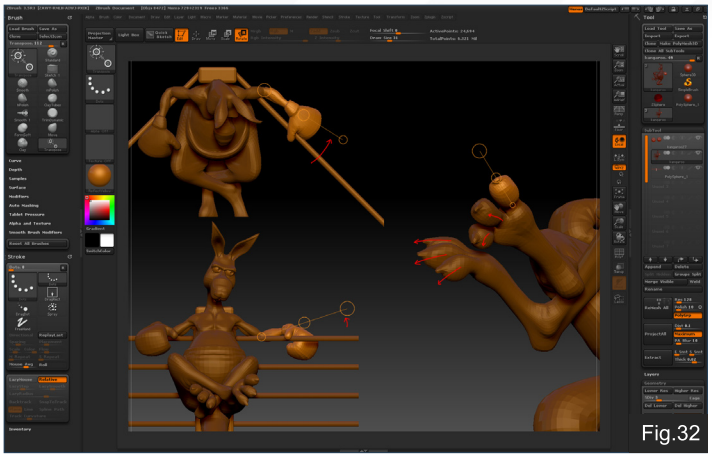


Fig.32

- Go to Geometry subdivision level five
- Use the Smooth brush over the entangled area.
- Go to Geometry subdivision level six
- Use the Smooth brush over the entangled area.
- Go to Geometry subdivision level seven
- Use the Smooth brush over the entangled area.

Fine tuning 2 (**Fig.31**)

I think that the weight of the tail should be shifted forward in order to balance the character's weight. I have marked a red line on the image to illustrate this.

- Lower your subdivision level to two.
- Mask everything except the tail.
- In a side view, use the Move brush with a large brush size to pull the tail to a better position.
- Increase the subdivision level to three.
- Using the FormSoft brush, add more volume to the tail to make it look stronger.
- Using the Clay tool, start adding wrinkles at the point where the tail bends.
- Keep using the Clay brush until you think that you have reached the limit of detail of the subdivision level you are in. Move to the next subdivision level and keep sculpting until you reach the last subdivision level.

Fine tuning 3 (**Fig.32**)

Let's keep adding some asymmetry to the pose.

- At a subdivision level of three, mask everything except the forearm and glove of the left arm.
- Align the Transpose tool to the forearm with the center at the elbow.
- Rotate the forearm outwards and down until the glove lies on the ropes.

Now we want to give a more natural feeling to the toes.

- Mask everything except the toe you wish to adjust.
- Rotate each toe so that they don't lie on the same plane. Remember that his feet are in the air, not in contact with the ground.

Fine tuning 4 (**Fig.33**)

Let's give some expression to the eye area.

- At a subdivision level of five, zoom in on the face area.
- Using the Move brush with a big radius, pull the right eyebrow slightly up and the left eyebrow slightly down.
- With the Move brush, pull the area between the brows down to reinforce the expression.

Final Pose (**Fig.34**)

At this point we have reached an important milestone: the character is posed!

Preparing to Paint (**Fig.35**)

Before starting to paint the model, we will apply a shader that allows us to preview the final result with a reliable display of color. When

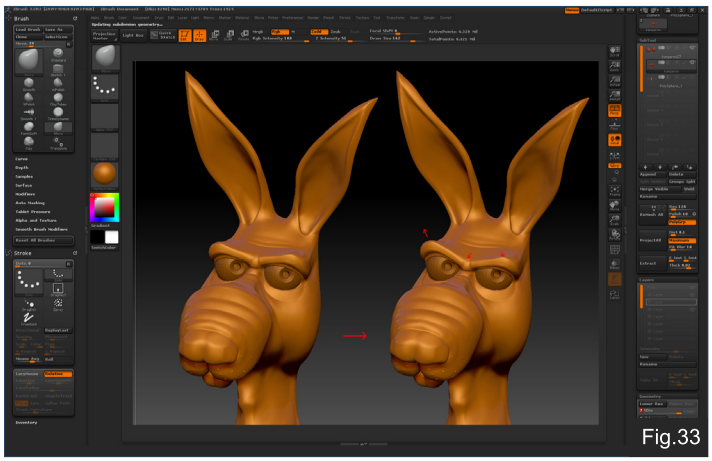


Fig.33

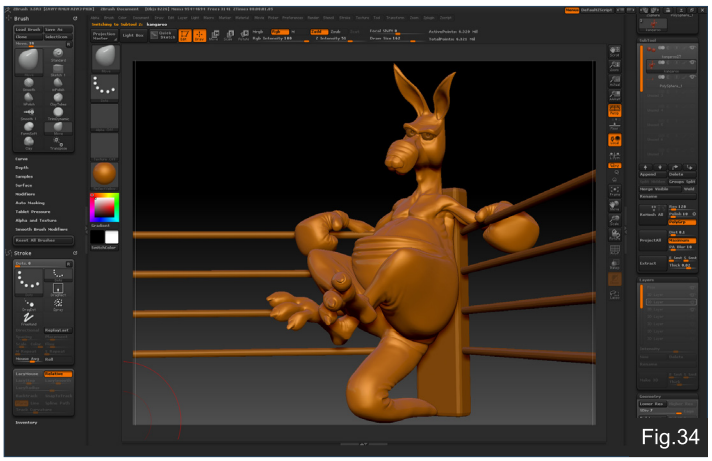


Fig.34

you have installed the UVMapper plugin, a new shader was added to the materials: the SkinShade4. It is an almost white material with a slight specular and is great for poly painting.

- From the Material menu pick the SkinShade4 material. The kangaroo should now be white.

Color reference (**Fig.36**)

I had made a color sketch of the kangaroo in the first chapter. We will use that sketch as a color reference. Notice how the snout, forearms, legs and chest have lighter tones. Also notice that the tip of the tail, ears and toes are darker. In **Fig.36** I have marked three RGB values in case you want to follow them, but feel free to use your own palette.

Color base (**Fig.37**)

Let's fill each subtool with a solid color.

- Make sure that we're at subdivision level seven.
- Select the subtool for the eyes
- In the Color menu, select a white color.
- Press the Fill Object button.
- Select the body subtool.
- In the Color menu insert the RGB values (R:168, G:101, B:63).
- Press the Fill Object button.
- Select the ring subtool.
- In the Color menu select a dark grey.
- Press the Fill Object button.

Paint setup (**Fig.38**)

To start the painting job we will take advantage of the Pose layer we have created before.

-Select the body subtool.

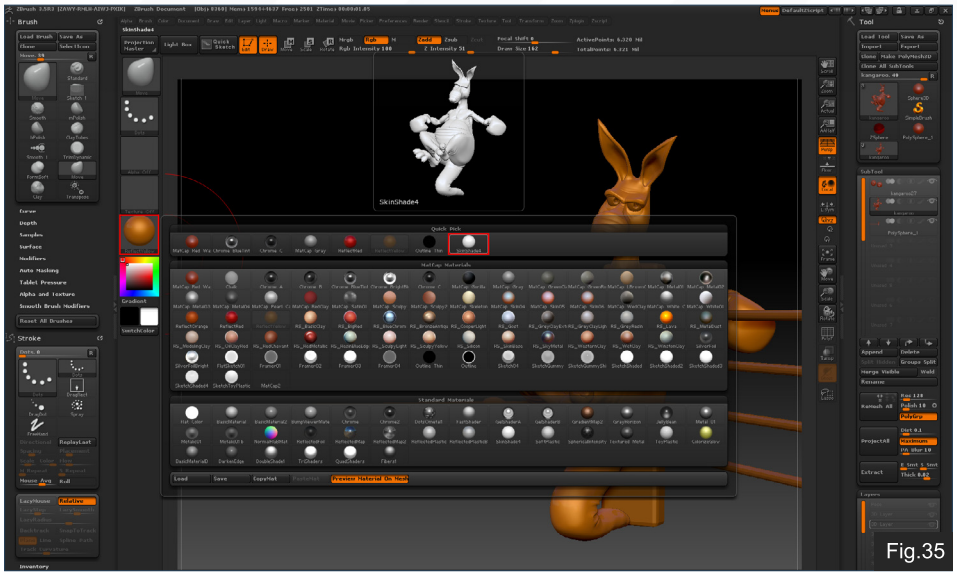


Fig.35

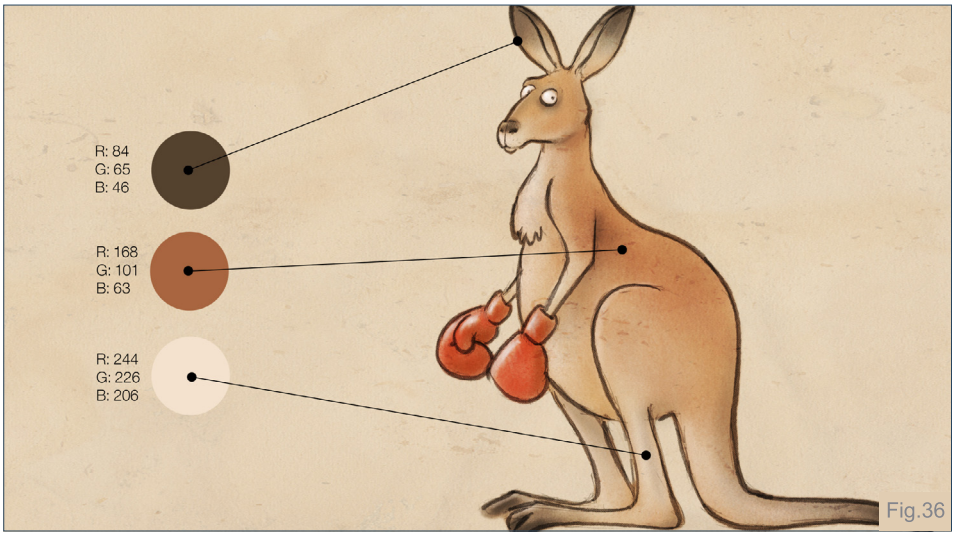


Fig.36

- In the Layers pull down, in the Tool Menu, press the eye icon next to the Pose layer to disable it. This way we will recover the T-pose.

NOTE: In case you can't find your layer, remember that to see a particular layer you have to be at the same subdivision level that you created it in. After disabling the layer, go back to subdivision level seven.

NOTE 2: Painting in T-pose is a matter of preference and taking advantage of the symmetry tools. You can paint in the final pose if you prefer.

- Activate Symmetry (press X key).
- Choose the Standard brush and make sure that RGB is on and Zadd is off. This way, when you paint, the surface will not be displaced, just colorized.

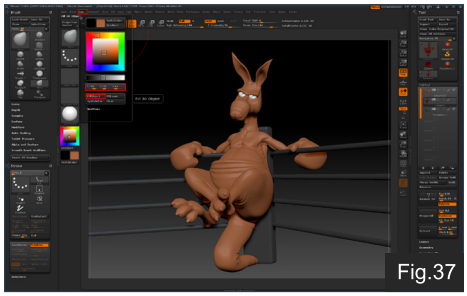


Fig.37

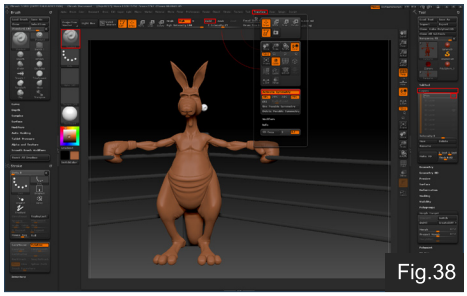


Fig.38


Fig.39

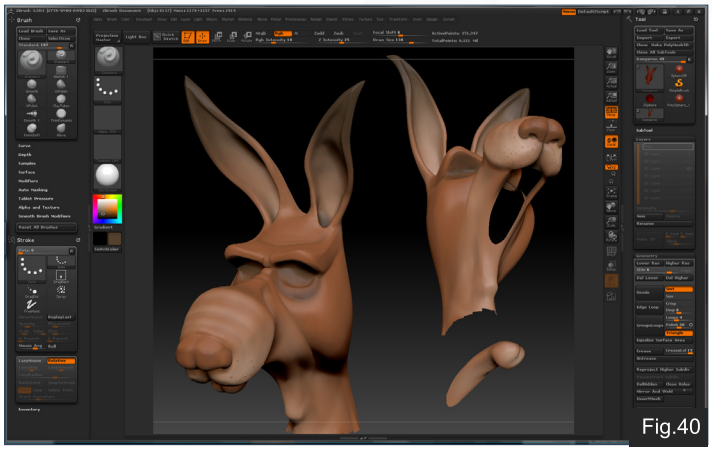


Fig.40

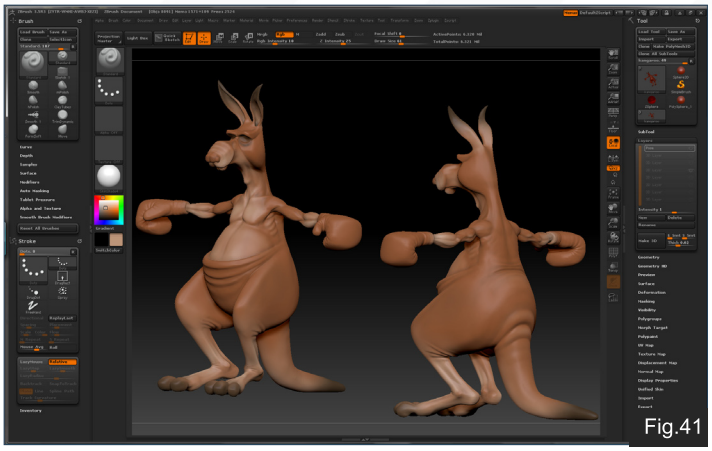


Fig.41

Paint light areas (**Fig.39**)

- Set the RGB Intensity of the Standard brush to 10.
- Go to the Color menu and set RGB to R: 244, G:226, B:206.
- Use a large sized brush and paint the lighter areas at the ears, snout, belly, forearms, tail and feet.
- Build the color up slowly as if you were using an Airbrush. Don't worry if some color spills to other parts, you can always refine it later. If you wish to blur the colors, press Shift to use the Smooth brush and make sure that Zadd is off, so that it doesn't affect the geometry.

Paint darker areas 1 (**Fig.40**)

- Set your color to R:84, G:65, B:46 in the Color menu.
- Isolate the head.
- Paint the top of the ears and the ear hole area.
- Paint the lower eye lids and the eye socket.
- Hide the lower part of the mouth to paint the interior parts of the upper mouth.
- As we are painting with a darker color, reinforce some of the natural lines on the head, like the wrinkles.
- Paint the spots on the snout.

Paint darker areas 2 (**Fig.41**)

- With the same dark color, paint the characteristic dark areas of the kangaroo: toes and tail.
- Use the dark color to mark the winkles, bony areas and muscle insertions.

Paint the Gloves (**Fig.42**)

- Isolate the boxing gloves.
- Set RGB Intensity to 100.
- In the Color menu set the color to R:140, G:24, B:23.
- Press the Fill Object button.

The gloves are now red.

- Pick a darker tone of red.
- Set RGB intensity back to 10.
- Paint the wrinkles and interior areas of the gloves.

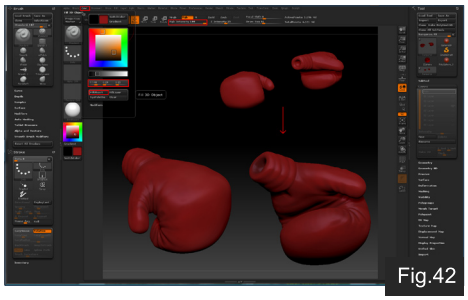


Fig.42

Paint the details 1 (**Fig.43**)

- Activate the Pose layer in the Layers pull down
- Press the X key to disable Symmetry mode.
- In the color menu set the color to pink (R:189, G:81, B:80)
- In the Brush menu, inside the Auto Masking pull down, enable the BackfaceMask button, so that when we paint the inside of the ears it doesn't paint the outside.
- Paint the inside of the ears.
- Paint the inside of the eye lids
- Give a hint of pink to the nose and cheeks.
- In the Color menu set the color to dark brown (R:51, G:37, B:26).
- Increase the RGB Intensity to 40
- Paint the nails on the kangaroo's feet.

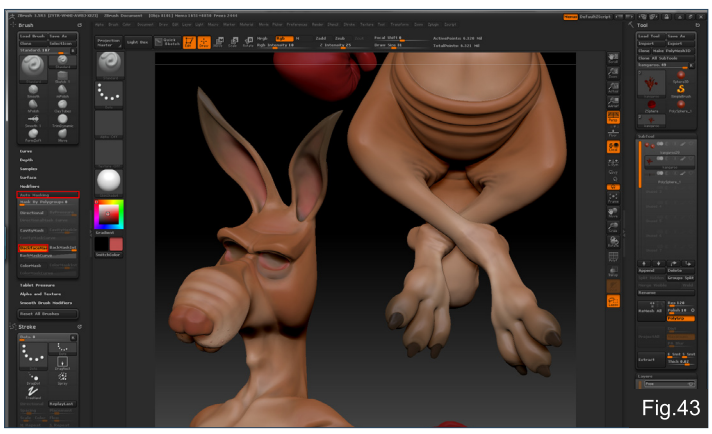


Fig.43

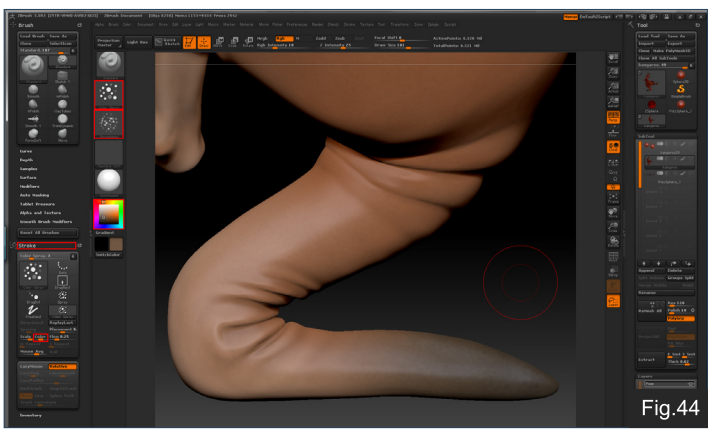


Fig.44

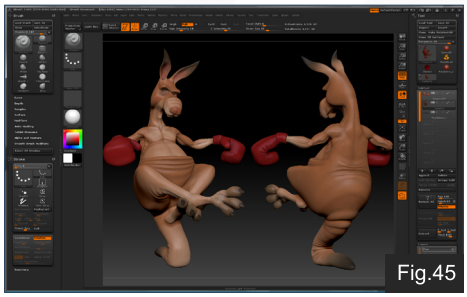


Fig.45

Paint some noise (**Fig.44**)

In order to achieve a more natural look we will blend the colors with some noise.

- Using the Standard brush, change the Stroke to Color Spray.
- For the Alpha pick Alpha07.
- In the Stroke menu, change the Color (Intensity Variance) slider to 0,5.
- Keep the RGB intensity value of 10.

We will pick the colors directly from the model and paint a bit over that area with the noisy brush.

- Click inside the color selector and drag over the model to pick the color at that point.
- Paint the area with the noisy brush a bit to make it uneven.

Check the tip of the tail in the image to see the noisy effect.

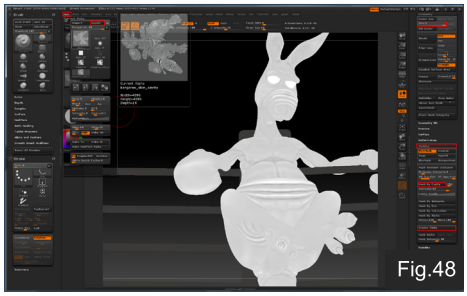


Fig.48

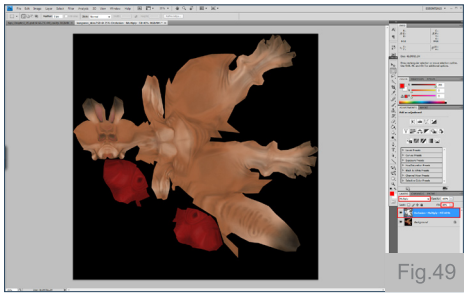


Fig.49

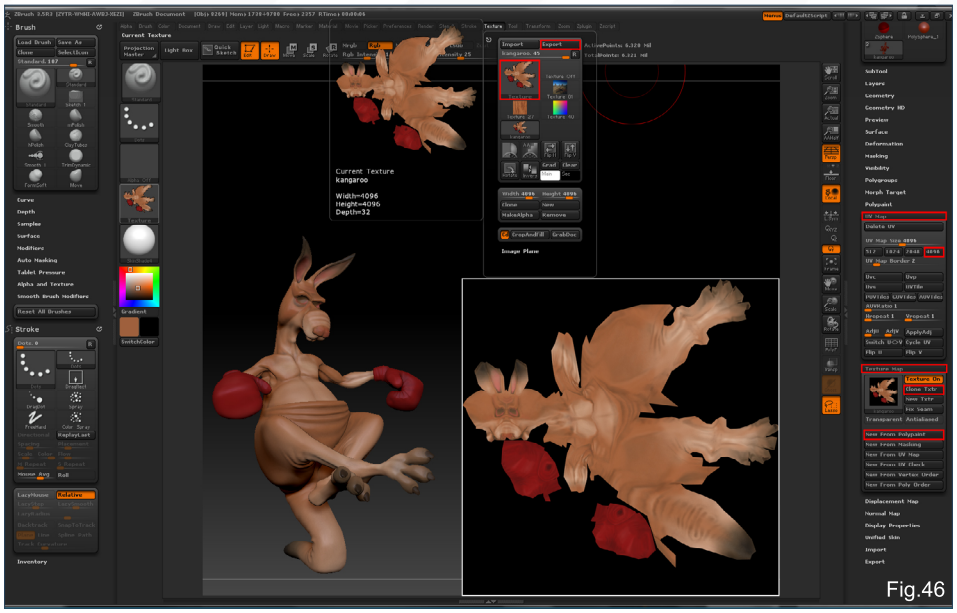


Fig.46

Paint finalized (**Fig.45**)

We have finalized the poly paint stage. In **Fig.45** you can see the result of the full body paint.

Generate the Texture (**Fig.46**)

We will create a 4K texture from the polypaint.

- In the Tool menu, under the UV Map pull down, press the 4096 button, so that the generated texture is 4096x4096 pixels.
- In the Tool menu, under the Texture Map pull down menu, click on the New from Polypaint button. A texture will be created respecting the UV coordinates we have set in the beginning.
- Click the Clone Txtr button to copy the texture to the Texture menu.
- In the Texture menu (the correct texture should already be selected), press the Export button and save the image with the name "kangaroo_ skin.psd".

Generate Occlusion map (**Fig.47**)

We will create an occlusion texture to mix with the base texture in Photoshop.

- Lower the subdivisions level to six.
- In the Tool menu, disable Colorize in the Polypaint pull down and disable the Texture On button in the Texture Map pull down. This is not necessary, but this way you can clearly view the occlusion mask.

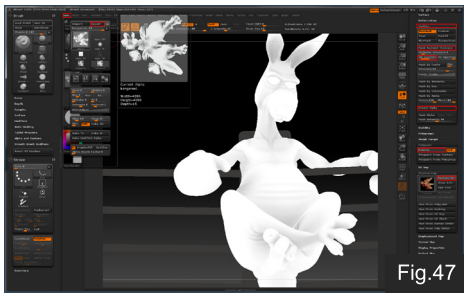


Fig.47

- Change the material to Flat Color, in order to see the occlusion mask clearly.
- In the Tool menu, under the Masking pull down, change the AO Scan Dist to 0,3.
- Press the Mask Ambient Occlusion button.
- Wait for the mask to be generated (it took about three minutes on my machine).

The mask is now visible in the viewport. Let's turn it into a bitmap.

- Press the Create Alpha button.
- Go to the Alpha menu and choose Export.
- Save the file as "kangaroo_skin_occlusion. psd".

Generate Cavity map (**Fig.48**)

We will now create a cavity texture to mix with the base texture in Photoshop.

- Raise the subdivisions level to seven.
- In the Tool menu, under the Masking pull down, press Mask by Cavity.

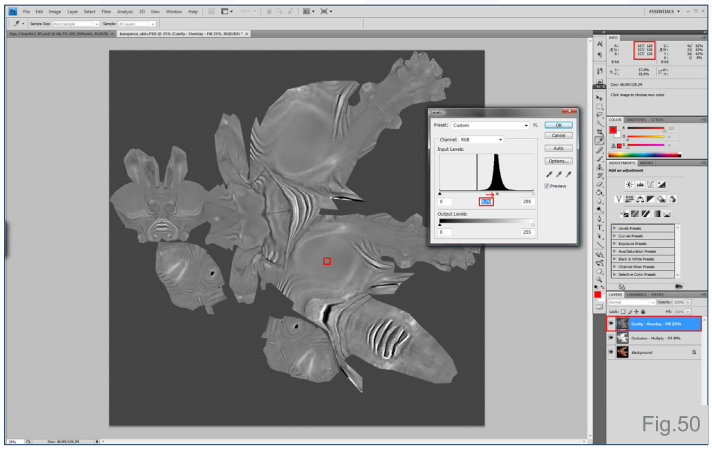


Fig.50

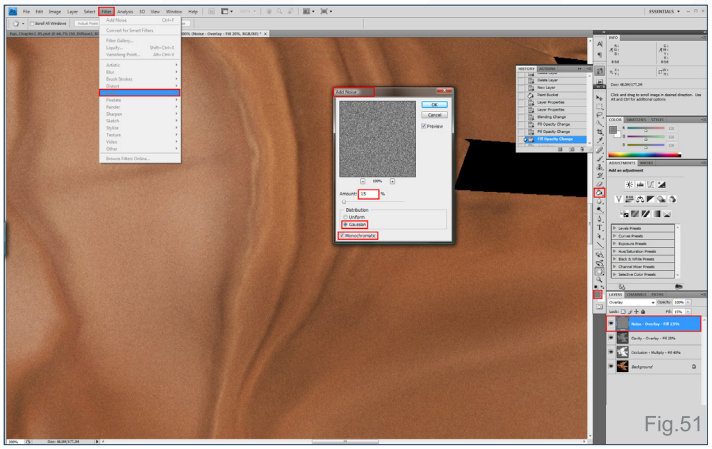


Fig.51

- Press the Create Alpha button.
- Go to the Alpha menu and choose Export.
- Save the file as "kangaroo_skin_cavity.psd"

Create the Diffuse map 1 (**Fig.49**)

In Photoshop we will start creating the Diffuse map.

- Open Photoshop.
- Load the "kangaroo_skin.psd" file
- Load the "kangaroo_skin_occlusion.psd" file.
- In the "kangaroo_skin_occlusion.psd" image select all (Ctrl + A).
- Copy the image to buffer (Ctrl + C).
- Switch to the "kangaroo_skin.psd" image.
- Paste (Ctrl + V). Answer Yes to convert the occlusion to eight bits as it is pasted.
- Change the occlusion layer blending mode to Multiply.
- Set the fill value to 40%.

Create the Diffuse map 2 (**Fig.50**)

- Load the "kangaroo_skin_cavity.psd" file.
- Select all (Ctrl +A).
- Copy the image to buffer (Ctrl + C).
- Switch to the "kangaroo_skin.psd" image.
- Paste (Ctrl + V). Answer Yes to convert the occlusion to eight bits as it is pasted.

We will be setting the blending mode of the cavity map to Overlay, but for it to work correctly we need to make an adjustment to the image's levels first. The Overlay blending mode works by applying the Screen blending mode to the pixels with a value over 50% and the multiply blending mode to the pixels with a value below 50%. So we want our average gray in the skin to be around 50% so that it is transparent, while the darker areas will multiply and the lighter areas will screen.

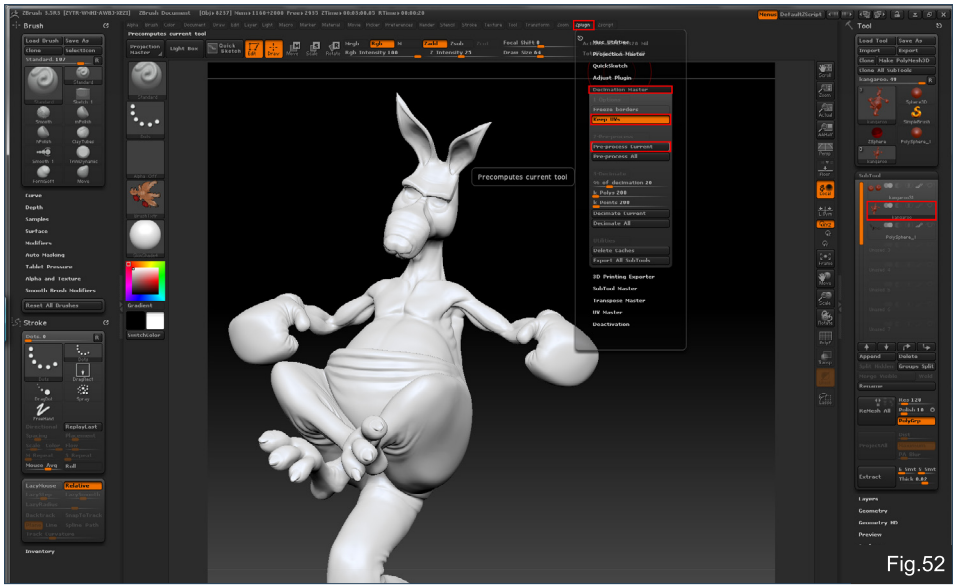


Fig.52

- With the Cavity map layer selected, press Ctrl + L to open the Levels adjustment window.
- In the Levels adjustment window change the mid value to 0,7. If you pass the cursor over the belly area and look at the Info window you will notice that the values changed from about 157 to 128 (which is the value for 50% gray).
- Press OK.
- Change the cavity layer blending mode to Overlay.
- Set the fill value to 25%.

Create the Diffuse map 3 (**Fig.51**)

- Create a new layer on top of everything and name it "Noise".
- Change the active color to a 50% gray (R:128, G:128, B:128).
- Select the Bucket Fill tool (press G) and click on the image to fill the layer with that color.
- Go to Noise > Filter > Add Noise.
- Change the amount to 15%, the distribution to Gaussian and Monochromatic to On. Then hit Apply.
- Set the layer blending mode to Overlay, with a Fill value of 15%.
- Use the Eraser (press E) with a soft brush to erase the non-furry areas of the image, like the nose, boxing gloves and interior of the eye lids.
- Save the images as "kangaroo_skin_diffuse.psd"

Decimation 1 (**Fig.52**) We will prepare the model in order to export it to 3ds Max. The model is very heavy, so we will use the Decimation Master plugin to make it lighter.

IMPORTANT: Save your model before starting the decimation process (Tool > Save As).

- Make sure that the body subtool is selected.
- In the Zplugin menu, click on Decimation Master to open the pull down menu.
- Enable the Keep UVs option.
- Press the Pre-process Current button, to prepare the model for decimation.

Decimation 2 (**Fig.53**)

After the processing is complete:

- Change the Decimation Value to about 4.9%.
- Press the Decimate Current button.
- You can press Shift +F to see the new geometric structure, which tries to preserve the details of the surface.

IMPORTANT: This isn't a good mesh structure to sculpt. Don't keep this model as your only copy.

Check (**Fig.54**)

If you would like to see how the texture you have created looks when applied to the decimated model do the following:

- Apply the "SkinShade4" material to the model.
- Go to the Texture menu.
- Press Import and pick the "kangaroo_skin_diffuse.psd" image.
- Go to the Tool menu and in the Texture Map pull down click on the image square and pick the texture from the pop up box.

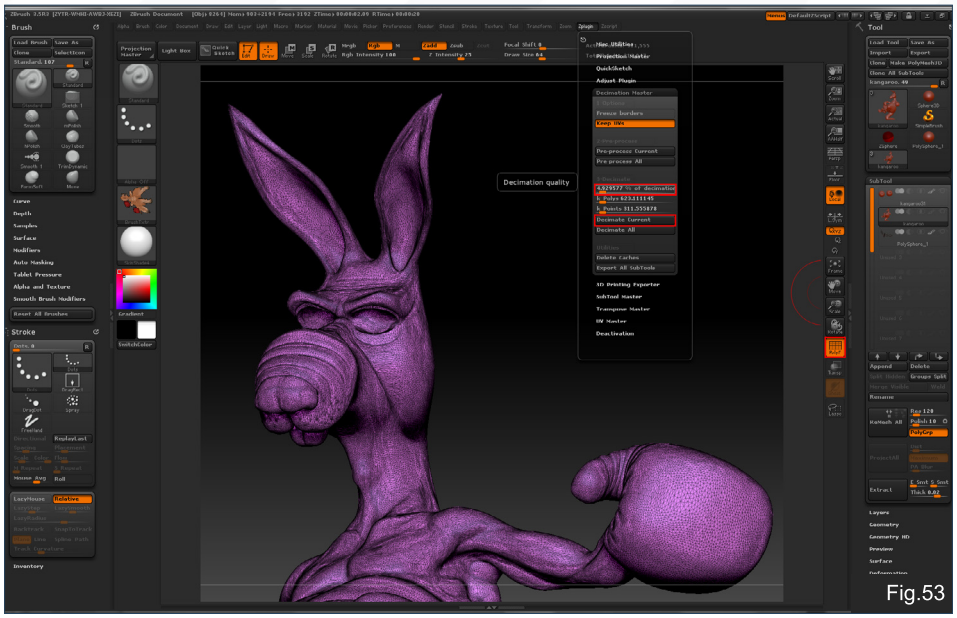


Fig.53


Fig.54

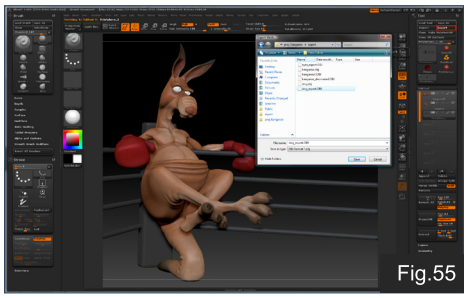


Fig.55

Export (**Fig.55**)

The next step is to export everything to 3ds Max.

- Export this mesh by going to Tool > Export and save it as "kangaroo_decimated.obj".
- Select the eyes subtool and export it as "eyes_export.obj".
- Select the ring and export it as "ring_export.obj".

Import to 3DSMax (**Fig.56**)

- Open 3ds Max.
- From the File menu, choose Import.
- Pick the "kangaroo_decimated.obj" file.
- In the OBJ Import Option menu, enable the Convert toggle and make sure the units are set to Meters. Also disable the Import Materials option.
- Repeat the same procedure for the "eyes_export.obj" and "ring_export.obj" files. If there are any naming conflicts while exporting just

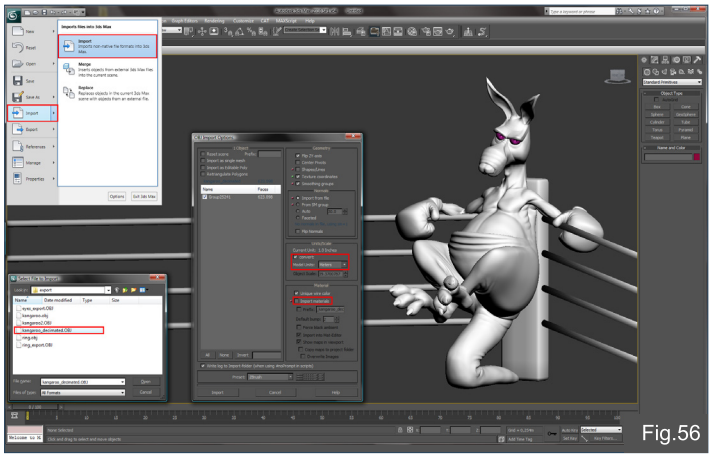


Fig.56

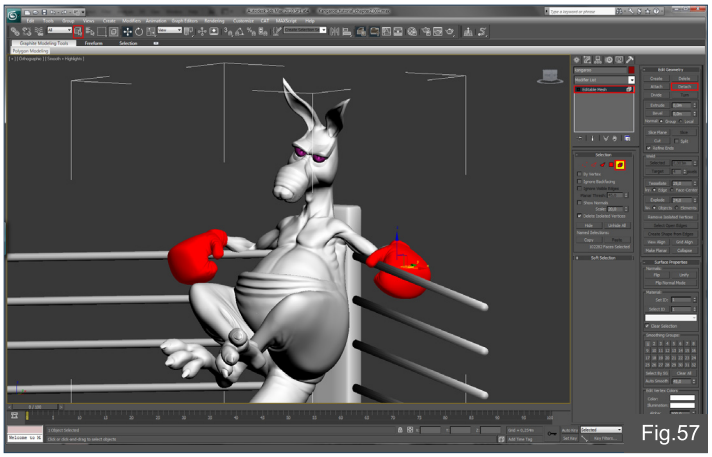


Fig.57

accept the new names suggested by 3ds Max. Or if you wish you can rename the objects to your liking.

Separate the gloves (**Fig.57**)

The gloves have a material which is quite different from the kangaroo, so let's separate them.

- Select the kangaroo mesh.
- Choose Element sub object.
- In Selection mode, click on both gloves to select them.
- Press the Detach button under Edit Geometry.
- Select the gloves's mesh and rename it gloves.

New eyes 1 (**Fig.58**)

The eyes we created before were only place holders. Now we will create the final eyes.

- Create a Sphere from the Standard Primitives with a radius of 0,043m and 32 segments.
- Rename it "Eye".
- While selecting the sphere, press Ctrl + V to Clone it.
- In the Clone Options choose Copy mode and name the new object "eye_cornea"
- Select the eye_cornea object and change its color for better reading in the viewport.
- In the Sphere options of the eye_cornea increase the radius to 0,044m.

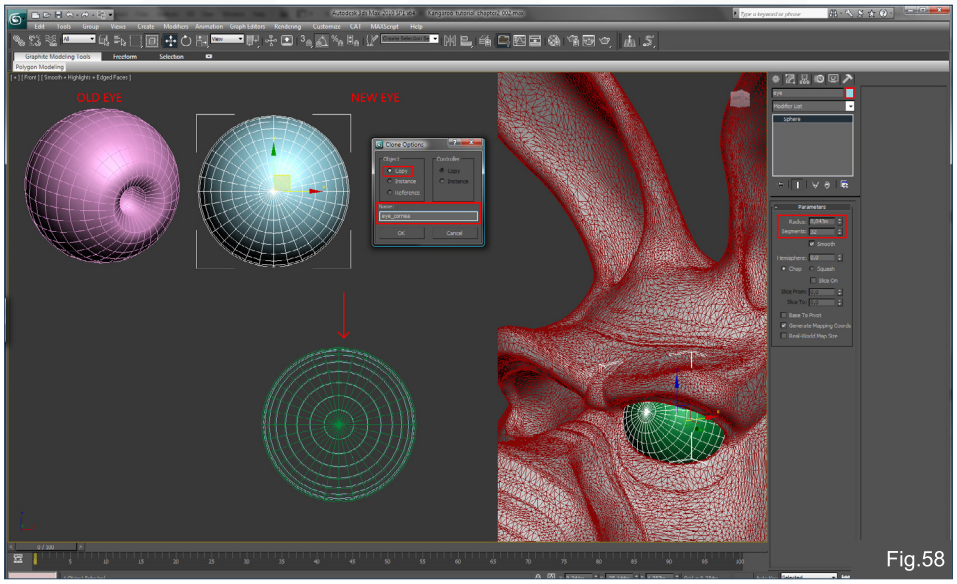


Fig.58

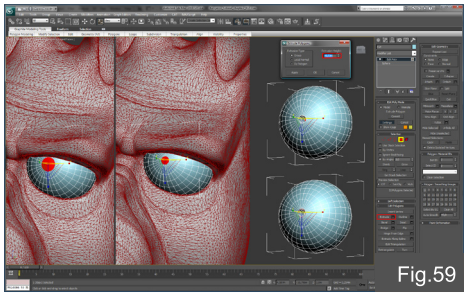


Fig.59

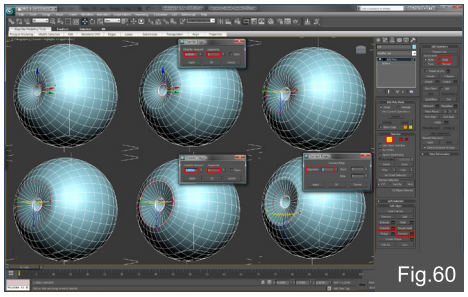


Fig.60

- Delete the old eyes.
- Select the eye and eye_cornea objects and move them together to fit in the eye socket of the kangaroo's head. Do not rotate them.
- Hide the eye_cornea object.

New Eyes 2 (**Fig.59**)

- Apply an Edit Poly modifier to the sphere.

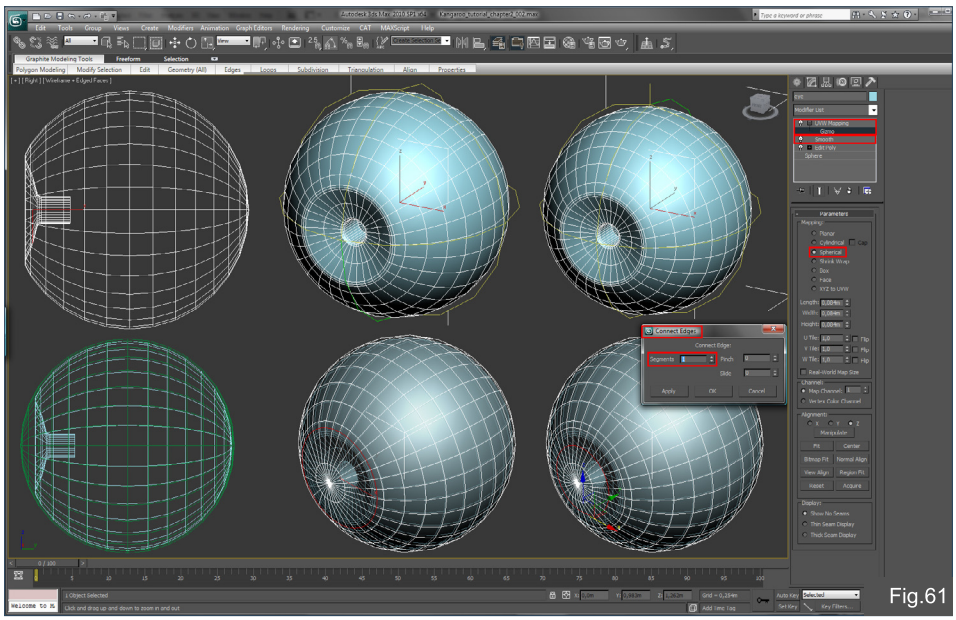


Fig.61

- Change to Polygon sub object mode.
- Select the polygons corresponding to the pupil of the eye.
- Scale the polygons to define the pupil's dimensions.
- Click the Extrude dialog box and set the extrusion height to -0,02m.
- Change to Edge sub object mode.
- Select the edges surrounding the pupil.

New Eyes 3 (**Fig.60**)

- Move the selected edges inward.
- Click the Chamfer dialog box and set a Chamfer Amount of 0,001m and 2 Segments.
- Select the edges surrounding the iris.
- If you wish to make the iris bigger, scale the edges with the Edge constraint enabled. Disable the constraints by choosing None after this operation.
- Click the Chamfer dialog box and set a Chamfer Amount of 0,001m and 2 Segments.
- Ring-select the edges in the iris.
- Click the Connect dialog box and use one segment to create an edge loop inside the iris.

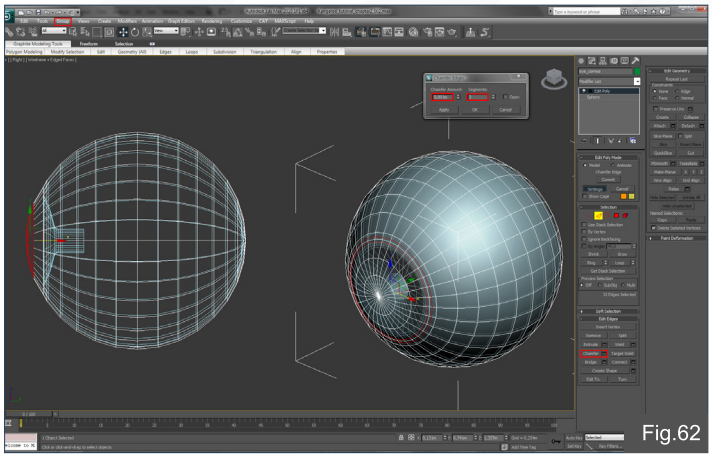


Fig.62

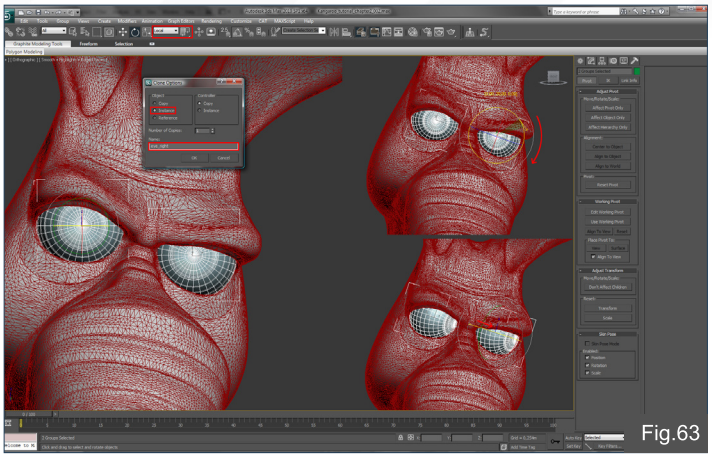


Fig.63

New Eyes 4 (**Fig.61**)

- Select the created loop.
- Pull the loop slightly inward to create a concave iris.
- Apply a Smooth modifier, turn on Autosmooth with a Threshold value of 90 degrees.
- Apply an UVW Mapping modifier. Choose Spherical as the type of mapping.
- Select the Gizmo sub object.
- Rotate the gizmo 90 degrees around the X Axis, so that the seam of the map is on the back part of the eye. The seam is indicated by the green line on the Gizmo.
- Un-hide the eye_cornea object.
- I have pressed Alt + X to make the cornea transparent on the viewport, making it easier to adjust with the eye interior. If you press Alt + X again the object becomes opaque again.
- Apply an Edit Poly modifier.
- Select the edge loop relating to the iris limit.
- Turn on the edge constraint.
- Move the edge loop inwards to align it with the iris limit.

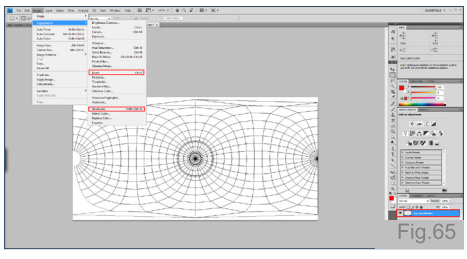


Fig.65

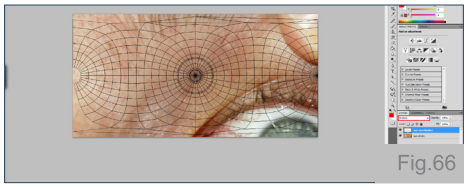


Fig.66

- Disable the edge constraint by changing it to None.
- Create an edge loop using the connect tool in the iris area.

New Eyes 5 (**Fig.62**)

- Select the polygons as indicated in the image and move them outwards to create a more convex area in the cornea in front of the iris.
- Select the edge loop of the exterior limit of the iris.
- Click the Chamfer dialog box and set a Chamfer Amount of 0,001m and 2 Segments.
- Apply a Smooth modifier. Turn on Autosmooth with a Threshold value of 90 degrees.
- Select the eye_cornea and eye objects and group them by going to the Group menu and choosing Group. Name the group "eye_left".

New Eyes 6 (**Fig.63**)

- Copy the eye_left group by shift + dragging the object with the left mouse button.
- In the Clone options box, choose Instance.
- Insert the name "eye_right".
- Move the eye_right group so that it fits in the right eye socket.
- Select the eye_right and eye_left groups.
- Rotate one of the eyes using the Local pivot to line up the rotation with the head tilt. You will notice that both eyes rotate at the same time using each group pivot, which is exactly what we need.
- Rotate the eyes again sideways to your liking. I will rotate them to the left of the character facing the viewer.

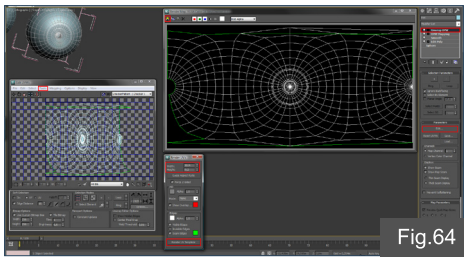


Fig.64

New Eyes 7 (**Fig.64**)

- Open one of the eye's groups (Group menu > Open) and choose the eye object.
- Apply an Unwrap UVW modifier.
- Press the Edit button.
- In the Edit UVWs window, go to the Tools menu and choose Render UVW Template.
- In the Render UVs window, change the Width value to 1024 and the Height value to 512.
- Press the Render UV Template button.
- A new window with the render coordinates pops up.
- Click the disk icon to save the image as "eye_coordinates.jpg"
- You can delete the Unwrap UVW modifier, if you wish. We have used it to obtain the eye coordinates image.

New Eyes 8 (**Fig.65**)

- Open Photoshop.
- Open the "eye_coordinates.jpg".
- Double click on the Background layer from the Layers panel and name it "eye coordinates".
- Desaturate the image by pressing Shift + Ctrl + U (or going to Image > Adjustments > Desaturate).
-Invert the image colors by pressing Ctrl + I (or going to Image > Adjustments > Invert).

Now we have a gray scale reference with a white background and dark lines.

New Eyes 9 (**Fig.66**)

We will download a photo from 3DTotal's free textures website as a base for the eye texture.

- Go to www.freetextures.3dtotal.com
- In the Human > Face folder choose the "_MG_5034.jpg".
- Click on Download Original to import the 1676x1204 photo.
- Open the "_MG_5034.jpg" image in Photoshop.
- Press Ctrl + A to select all.
- Press Ctrl + C to copy the selection to buffer.
- Change to the "eye_coordinates.jpg" image.
- Press Ctrl + V to paste the eye photo to a new layer.
- Click with right mouse button on the new layer and choose Layer Properties.
- Change the layer name to "eye photo".
- In the Layers panel, click on the eye coordinates layer and drag it over the eye photo layer so that the eye coordinates are on top of the eye photo.
- Change the blending mode of the eye coordinates layer to Multiply.

New Eyes 10 (**Fig.67**)

- Change to the eye photo layer.
- Select the Move tool (press V).
- Move the eye photo so that the iris is centered with the guides.
- Go to the Edit menu and choose Transform > Scale.
- Move and scale the image so that the iris of the photo matches the iris of the coordinates. Do not line up the pupil as it is not centered.

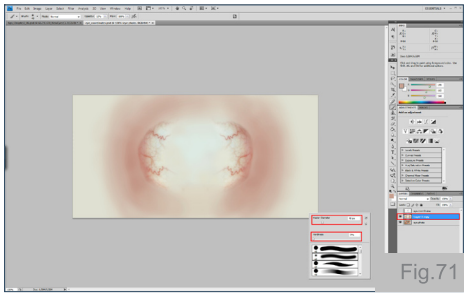


Fig.71

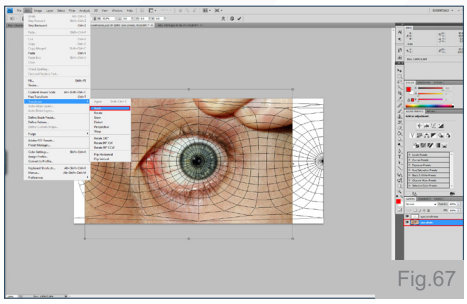


Fig.67

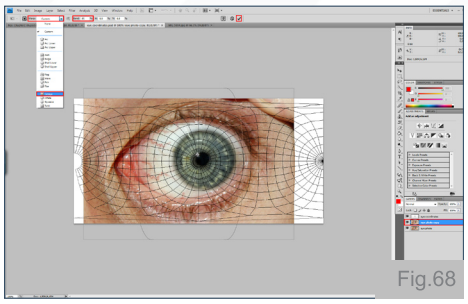


Fig.68

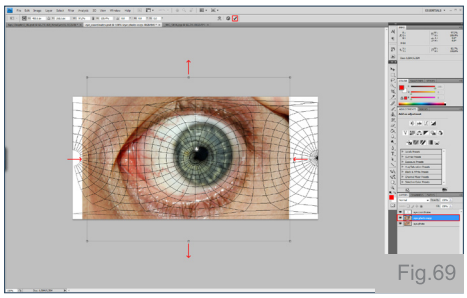


Fig.69

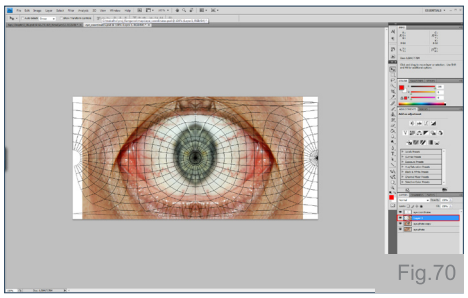


Fig.70

New Eyes 11 (**Fig.68**)

- Right click on the eye photo layer.
- Choose duplicate layer.
- Accept the "eye photo copy" name.
- From the Edit menu choose Transform > Warp.
- In Warp choose the FishEye distortion.
- Increase the Bend percentage to 85%.
- Click the OK icon.

New Eyes 12 (**Fig.69**)

- Go to Edit > Transform > Scale.
- Scale the image as in the photo by increasing its height and shortening its width.
- Press the OK icon.

New Eyes 13 (**Fig.70**)

- With the Rectangular Marque tool (press M), select the left half of the eye.
- Copy (Ctrl + C).
- Paste to a new layer (Ctrl + V).
- In the Edit menu choose Transform > Flip Horizontal.

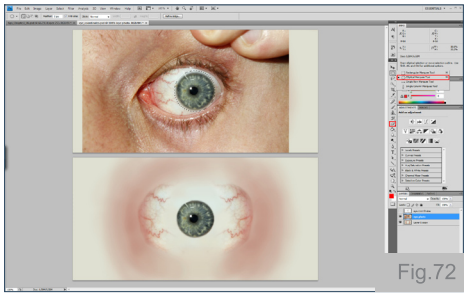


Fig.72

- Move the new layer so that the eye image is mirrored with the center at the eye center.
- With the Ctrl key pressed click on the eye photo copy layer, so that the new layer and this one are both selected.
- Click with the right mouse button and choose Merge Layers.

New Eyes 14 (**Fig.71**)

- Hide the eye coordinates layer (click on the eye icon next to it).
- Choose the Brush tool (press B).
- Choose a round brush with a size of 40 and 0% Hardness.
- With the Alt key pick the colors directly from the eye image and paint over the iris.
- Choose the lighter and yellowish tones for this area.
- Also picking colors from the image, create a reddish area around the eye globe. Use an opacity of 10% in your brush if you prefer to build the colors slowly.

New Eyes 15 (**Fig.72**)

- Drag the eye photo layer so that it is on top of the layer you have just painted.
- In the Marquee tool choose the Elliptical Marquee Tool.
- Start the selection by dragging with the left mouse button from the center of the eye while pressing Alt + Shift to make the selection

circular and start at the center.

- Select the iris and a small white area around it.
- Invert the selection (Shift + Ctrl + I).
- Press the Delete key.
- Choose the Eraser tool (Press E).
- Choose a soft rounded brush with a diameter of 15 and 0% hardness.
- Erase the white area around the iris to blend it with the base layer.

New Eyes 16 (**Fig.73**)

- Use the Clone Stamp tool (press S) to eliminate the white highlights of the eye. Click while pressing Alt on the area to sample and then paint on the highlight area.
- With the Brush tool active (press B) press Alt and click on the color of the pupil to pick that dark color.
- Create a new layer on top of the eye photo layer and name it "pupil".
- Turn on the eye coordinates layer.
- Choose a round brush with a diameter of 60 and Hardness of 75%.
- In the pupil layer, click on the center of the iris to paint it. Use the eye coordinates layer as a reference for the center.

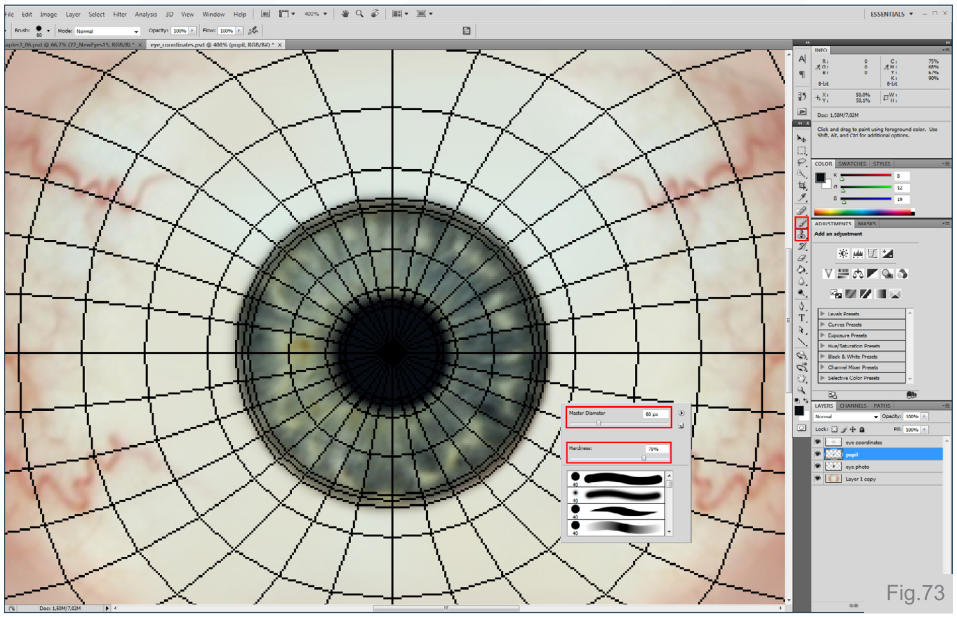


Fig.73

New Eyes 17 (**Fig.74**)

I have decided to give a the character a red iris, so let's look at how to do that.

- With the pupil layer selected, choose Image > Adjustments > Gradient Map.

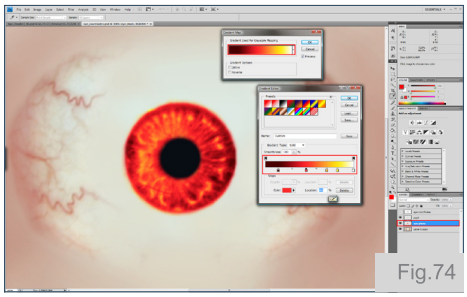


Fig.74

- In the Gradient Map window click on the gradient swatch.
- In the Gradient Editor window, click on the arrows under the gradient bar to define the colors that will replace the original image according to their values. I have used a warm gradient scale ranging from red to yellow.
- Press OK.

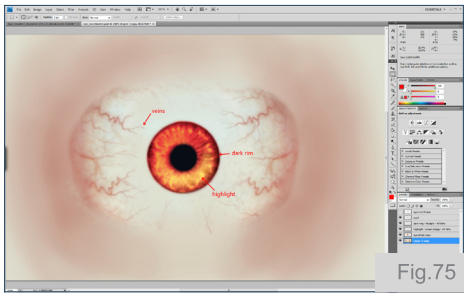


Fig.75

New Eyes 18 (**Fig.75**)

Here you are free to personalize the eyes. Here is what I have done:

- Created a darker rim around the iris. I have created a circular selection and painted with a darker color inside the selection.
- I have added a brighter area on the lower side of the iris. I have chosen a yellow color (R:239, G:216, B:64), created a new layer in Linear Dodge mode, with a Fill value of 75%, and painted with a low opacity soft round brush .
- By picking the vein colors directly on the photo and using a round brush with pressure sensitive size, I have drawn a few more veins on the eyes.
- Once you're happy with your eye, right click one of the layers in the Layers menu and choose Flatten Image.
- Save the image as "eye_diffuse.jpg".

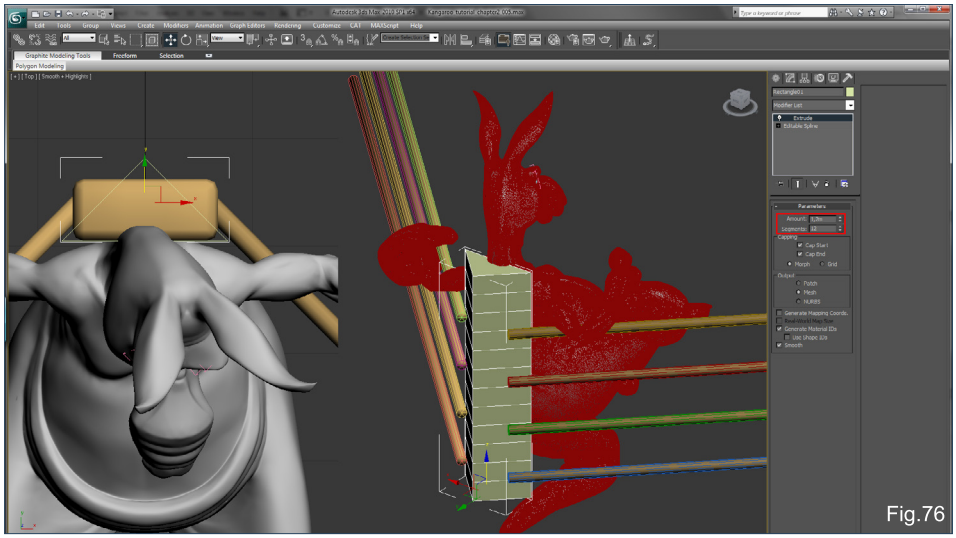


Fig.76

Ring 1 (**Fig.76**)

Let's go back to the boxing ring.

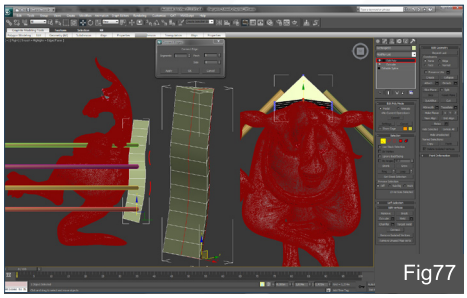


Fig77

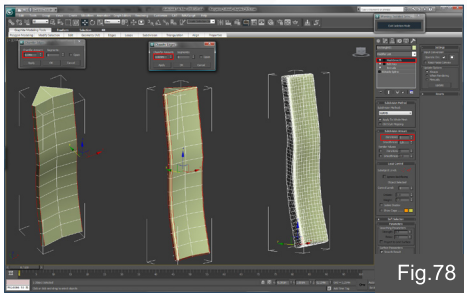


Fig.78

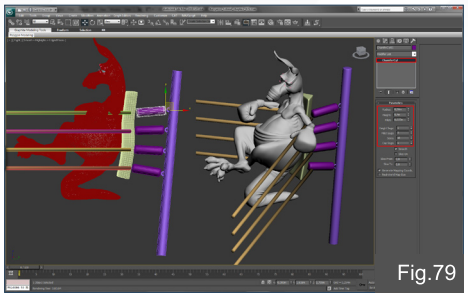


Fig.79

The box and cylinders we have used were only place holders. We will build the ring elements, but I won't detail the process of creating the props with as much detail as the character, as the objective of this tutorial is to create the character. Feel free to add any other props.

If you do some research on the internet, you will notice that the pads on the ring's corners are not fixed on the ground. Let's start by modeling the pad.

- Create the shape of a triangle in the top view port, one side parallel to the back of the kangaroo and the other two parallel to the ropes.
- Extrude it with a height of 1,20m and 12 segment subdivisions.

Ring 2 (**Fig.77**)

- Apply an Edit Poly modifier.
- In a side view, move the vertexes as if the kangaroo's weight was pressing against the pad.
- Create an edge loop on the polygons facing the back of the kangaroo.
- Pull the vertexes on the edge loop inwards.

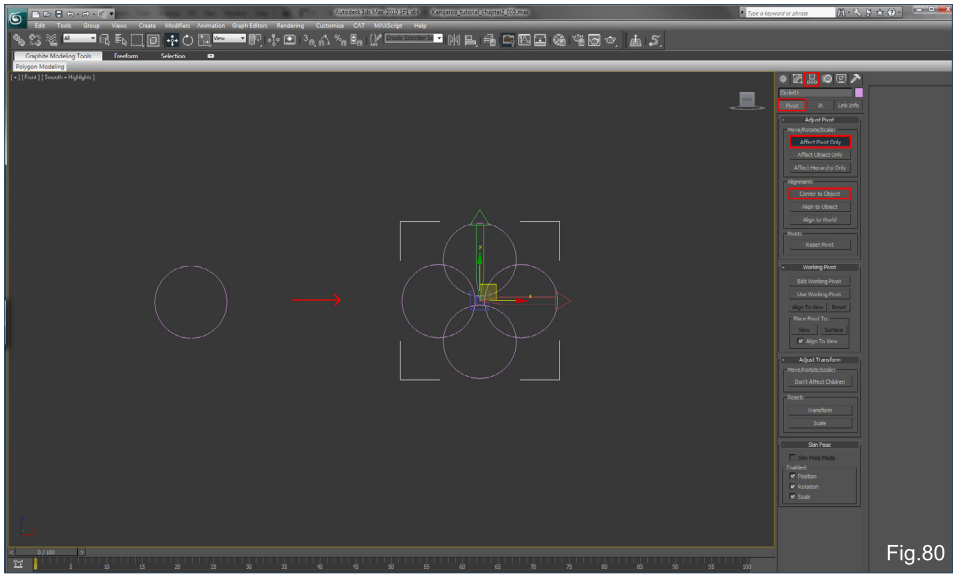


Fig.80

Ring 3 (**Fig.78**)

- Select the lateral edges of the pad and chamfer them 0,04m.
- Select all the surrounding edges and chamfer them 0,009m.
- Apply a Meshsmooth modifier with 2 iterations.

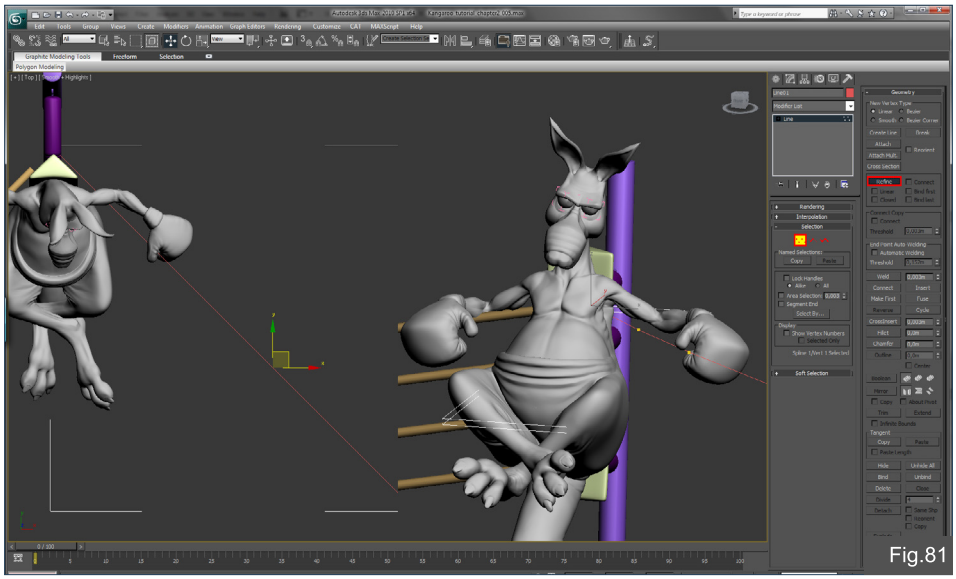


Fig.81

Ring 4 (**Fig.79**)

- To create the tensors of the pad, create a Chamfered Cylinder (from the Extended Primitives) with a height of 0,4m and a radius of 0,06m. Use a fillet value of 0,027m and 3 segments for the fillet.
- Clone the tensor pads four times. Each tensor originates on each rope.
- For the structural post create a cylinder with a height of 2,55m and a radius of 0,065m. I have rotated the post outwards. Chamfer the top of the post 0,007m.
- Create four fixation rings with a torus primitive with a radius of 0,027m and a thickness of 0,08m.

Ring 5 (**Fig.80**)

We will now create the ropes.

- In the front view port create a Circle shape with a radius of 0,015m
- Apply an Edit Spline modifier.
- Select the Spline subobject mode and clone the circle by Shift + dragging in order to have

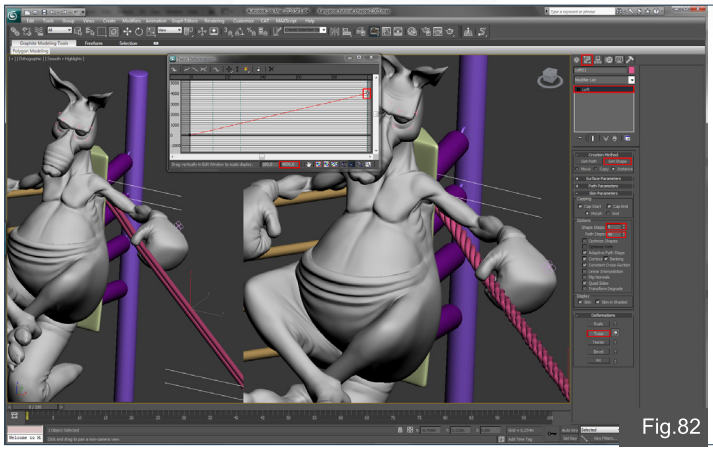


Fig.82

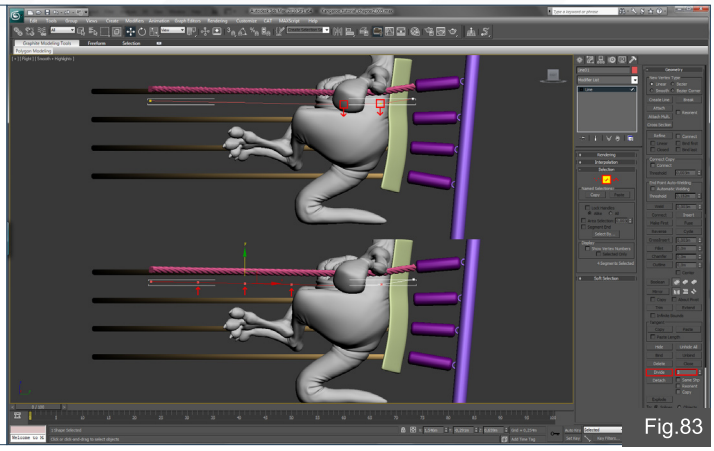


Fig.83

four circles creating a square. They should intersect at the central area (please see **Fig.80**).
- In the Hierarchy panel, press Affect Pivot only.
- Choose Center to Object. The pivot is now centered to the shape.

Ring 6 (**Fig.81**)
- In top view, create a line for one rope.
- In vertex sub object mode, press the Refine button.
- Create two new vertexes on the line, one under the arm and the other where the glove touches the rope.

Ring 7 (**Fig.82**)
- Select the line.
- In the Create menu choose Compound Objects.
- Press the Loft button.
- Press Get Shape and click on the shape with four circles that we have created.
- In the Modify panel, in the Loft options, change the Shape steps to 5 and the Path steps to 40.
- Press the Twist button under Deformations.
- A window will open with a graphic representing the twist values.
- Click on the point on the right side.
- In the value box at the bottom on the right insert the value 4000.

Ring 8 (**Fig.83**)
The rope is twisted. You will notice that one part of the rope doesn't have enough steps for the twist to be smooth. We will first position the vertexes under the arm and at the hand. Then we will subdivide the part of the rope so that it looks smooth.

- In a side view, select the line which originated the loft.
- Move the vertexes near the elbow and the glove down, to give the idea that the arm is resting on the rope. The loft will update when you change the line.
- Choose the Segment sub object mode.
- Select the segment of the line where the lack of smoothness occurs.
- Insert a value of three near the Divide button.
- Press the Divide button.

The rope should look good now.

Ring 9 (**Fig.84**)
- Repeat the procedure to create the remaining ropes of the ring.
- You can delete the box and cylinders that were used as guides for the ring.
- In the top view, create a box with 4,0m of width and length and a height of -0,8m.
- Rotate the box 45 degrees, so that the sides of the box are parallel to the ropes.
- Adjust the box on the top and side views so that the top of the box touches the bottom part of the kangaroo's tail.
- Chamfer the corners of the ring.

Leaf 1 (**Fig.85**)
We will now create the leaf that the kangaroo is chewing.

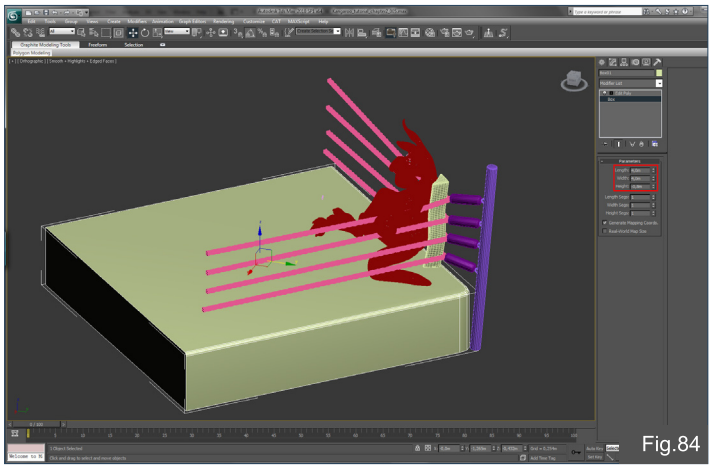


Fig.84

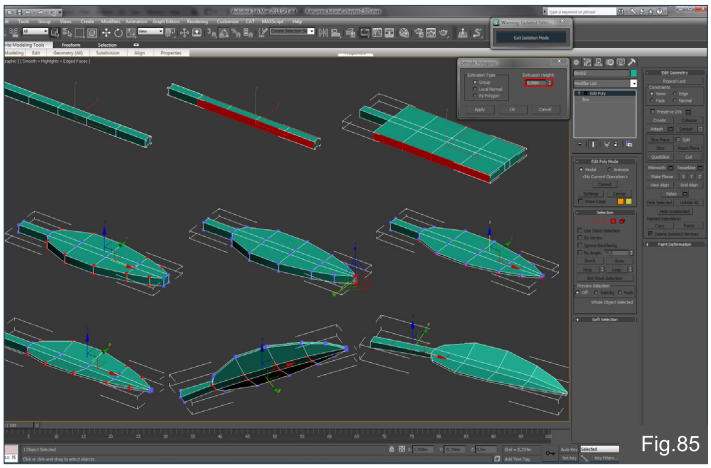


Fig.85

- In the Top view port create a box with a length of 0,02m, width of 0,4m and a height of 0,02m.Use five segments for the width and one segment for the length and height.
- Apply an Edit Poly modifier.
- Select four polygons on each side of the box and extrude them 0,06m.
- Move the vertexes on each side to achieve the shape of a leaf.
- Pull the vertexes at the tip of the leaf to make it pointier.
- Move the lower vertexes on each side of the leaf to make it thinner.
- Move the vertexes on each side of the leaf to describe a small natural curve.
- Move the vertexes underneath the leaf, near the center, to describe a small arch under the leaf.
- Create two edge loops around the stem and move them to extend and curve this part of the leaf.

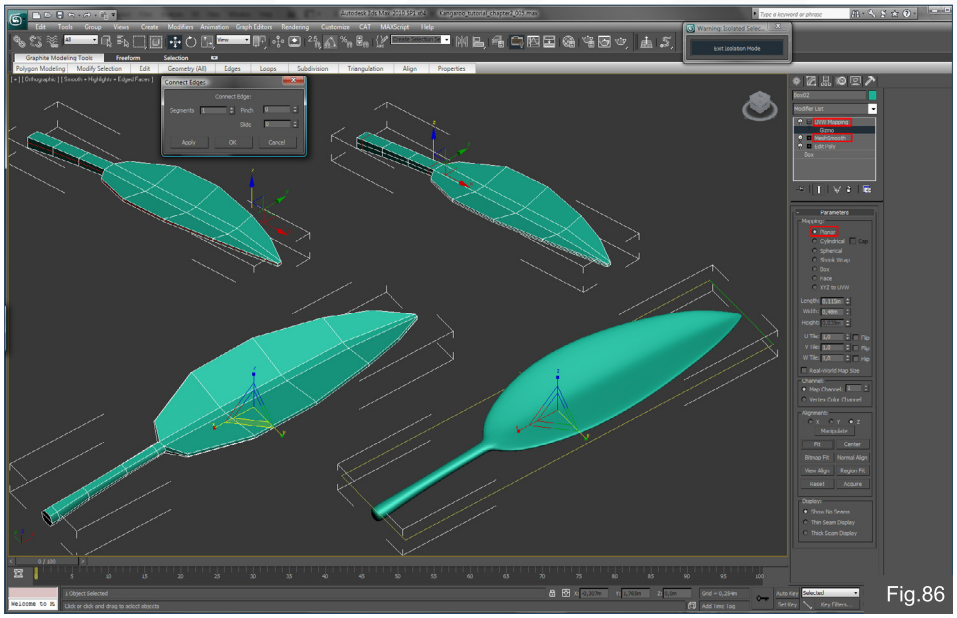


Fig.86

Leaf 2 (**Fig.86**)

- Create a horizontal edge loop around the leaf.
- Create two edge loops on the stem, one near the end and other near the leaf.
- Move the vertexes to make the stem thinner and rounder and also to reduce the width on the central part of the leaf.
- Apply a MeshSmooth modifier with two iterations to smooth the geometry.
- Apply a Planar UVW Mapping to the leaf.

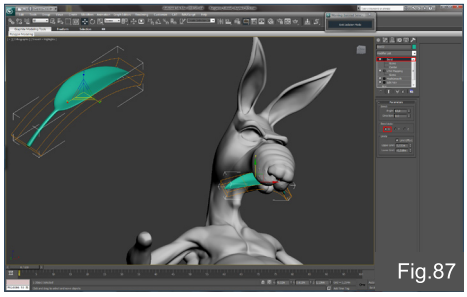


Fig.87

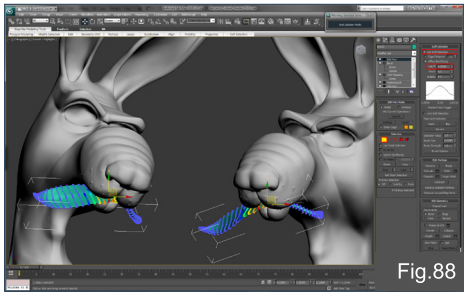


Fig.88

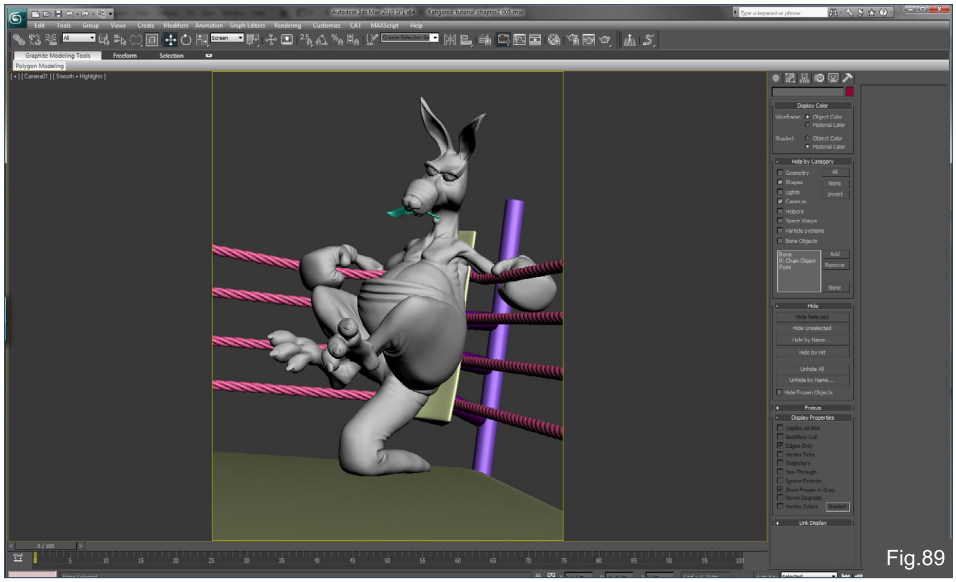


Fig.89

Leaf 3 (**Fig.87**)

- Apply a Bend modifier to the leaf.
- Change the Bend Axis to X.

As you change the Bend Angle Value you will see the leaf bending. We will place the leaf on the kangaroo's mouth and then adjust the Bend Angle to a value that looks good.

- Move, Rotate and Scale the leaf to place it in the mouth of the kangaroo.
- Adjust the bend value so that the leaf fits the best way in the mouth.

In my case I have activated the Limit Effect toggle in the Bend modifier and changed the values to fine tune the fit even further.

Leaf 4 (**Fig.88**)

It is highly probable that there are still some intersecting areas between the leaf and the mouth. You can use an Edit Poly modifier with soft selection to refine those.

- Apply an Edit Poly modifier.
- Use the Vertex sub object mode.
- Enable the Use Soft Selection toggle.

The Falloff value defines the influence area around the selected vertexes. Select the vertexes intersecting with the mouth. Define the

influence area with the falloff value and move them. You can also shape the leaf a bit more with this technique as I have done.

End of Chapter (Fig.89)
In this chapter we have posed the character, painted the character's textures and modeled the scene props. In the next chapter we will deal with the creation of the materials, lighting and render to finalize our character.

I hope you are enjoying the ride! See you in the next chapter (**Fig.90**)!

Jose Alves da Silva

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Fig.90

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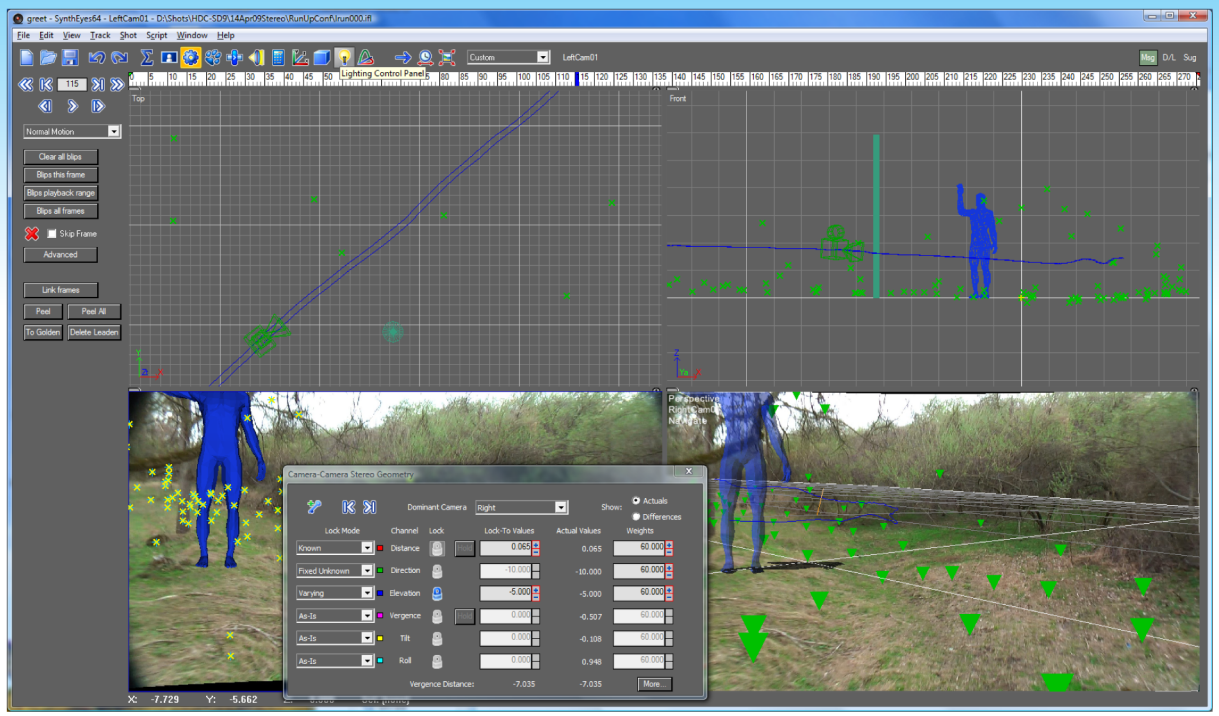

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MUDBOX

FEMALE CHARACTER CREATION

Welcome to Mudbox female character creation with Wayne Robson. This series will be providing a comprehensive guide to sculpting female characters using Mudbox. Wayne Robson will talk us through identifying the characteristics that define what is unique in each of our female characters, and will then give advice about sculpting these using many of the features that are available when using Mudbox.

CHAPTER 3 - EXTREME PIERCINGS & TATTOOS

Software used: Mudbox

INTRODUCTION

This model is actually by far the easiest to sculpt and texture of all the modes in this series. What does take more time is the material, light and render setup. Oh and the hair... let's not forget what a pain in the backside that can be. While I consider my "skills" with Max Hair and Fur to be not exactly stellar I'll pass on what I have found helps when setting things up. I'll also cover my setup for a realistic human eye as well as the SSS skin shader. So this article goes far beyond just sculpting and texturing the model.

KICK THE BASE

By now you should have noticed that each article in this series uses a different way of working. We've covered sculpting using image planes and textures to help us, in a classical style by "eye", and now we're going to cover probably the most used workflow in production: sculpting from a "proper" poly base mesh. Now I'm not going to cover the creation of the base mesh as there are a million tutorials online that cover polygon head creation in just about every 3D package ever made. It's less important how you do it; more that you can do it when needed.

I don't find raw polygon modeling very enjoyable, so when doing models I avoid it like the black plague. But it is a skill that you will need if you are serious about working in a production environment. Personally I am not afraid of including the occasional triangle providing it doesn't hinder any deformation at animation time. As this model is for a still image we can get away with it, but out of habit I've kept the topology so that should it ever need to be animated... it could be (**Fig.01**).

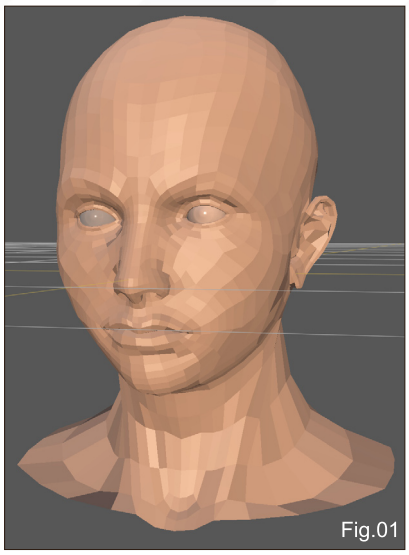
Fig.01

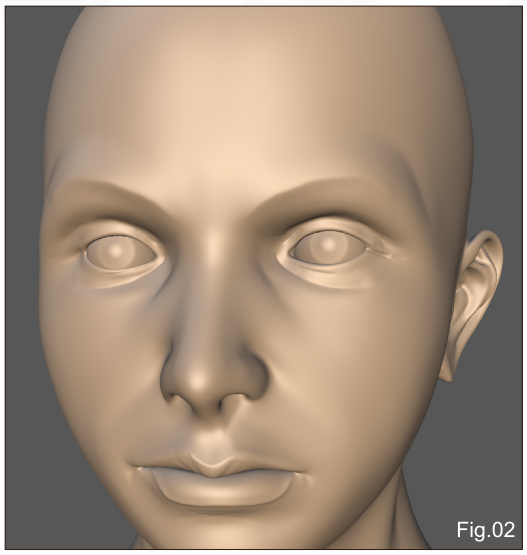
Fig.02

SCULPTING

As you will see in the videos that accompany this article, when you're working from a higher resolution polygon mesh, life gets a lot simpler from a sculpting perspective. Most of the work on this head is to refine and correct shapes so we won't need as many polygons as we have done in the previous articles in this series. As usual both the overall face shape and eyes take the most work (See Video 1 in downloadable movie resource folder). As most of our detail will be from the bump map we don't have to detail it too much, in fact the total final polygon count for the head is under ½ million (**Fig.02**).

When sculpting the eyes I make them a little less thick than last time, as I imagine her as a young girl. So her eyelids won't be quite as thick as an older person. They will also be far smoother and a bit "flatter" in the way they wrap around the eyeball, as we are dealing with young skin which has more elasticity (**Fig.03**).

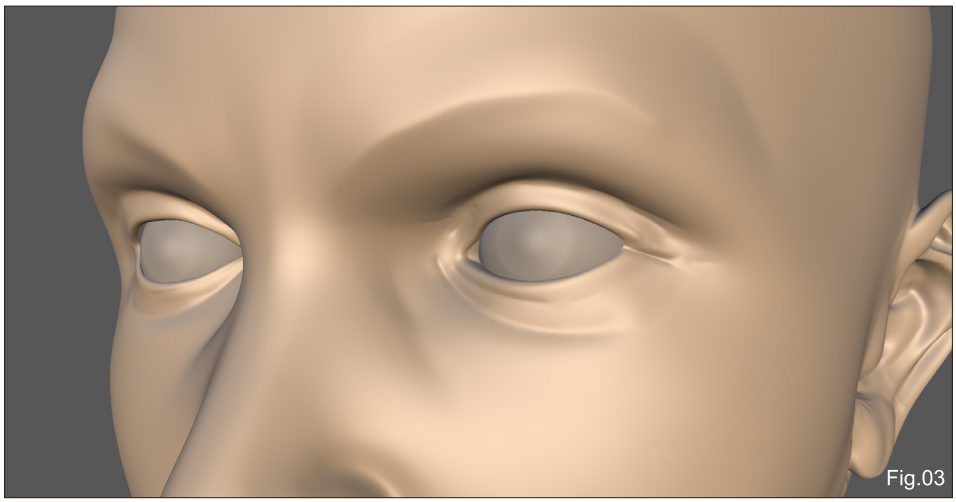
Fig.03

USING MUDBOX BONES TO RE-PROPORTION A SCULPT

You will notice in the videos that quite early on I use a bone and painted falloff to re-proportion the top part of the skull. Bones in Mudbox are not just useful for posing your sculpt; they can also help when you need a large area re-sized. The process to do this is very simple and intuitive:

1. Step to a lower subdivision level.
2. Create a new sculpting layer (this means you can fade any changes in and out).
3. Drop into an orthographic view (in our case a side-on view helps a lot).
4. Draw bone.
5. Correct any falloff-related issues like too large an area being weighted using the Falloff brush

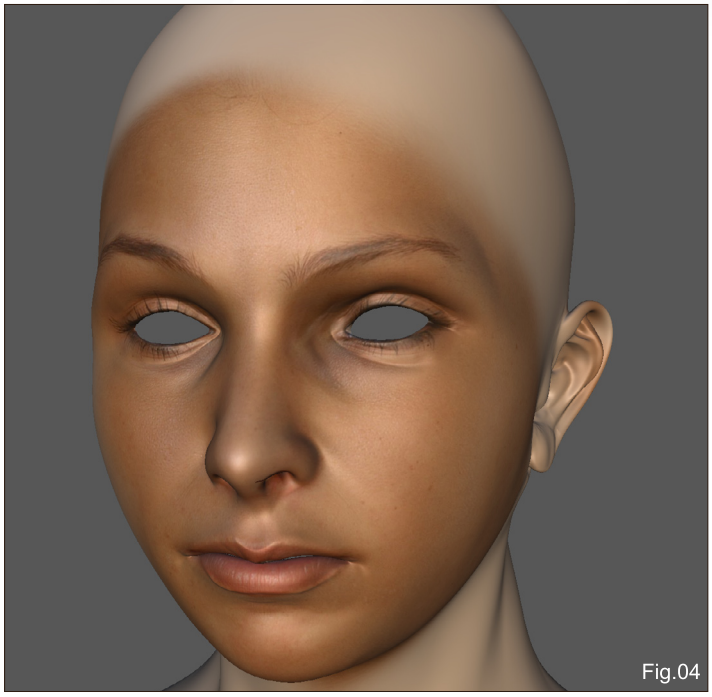
Fig.04

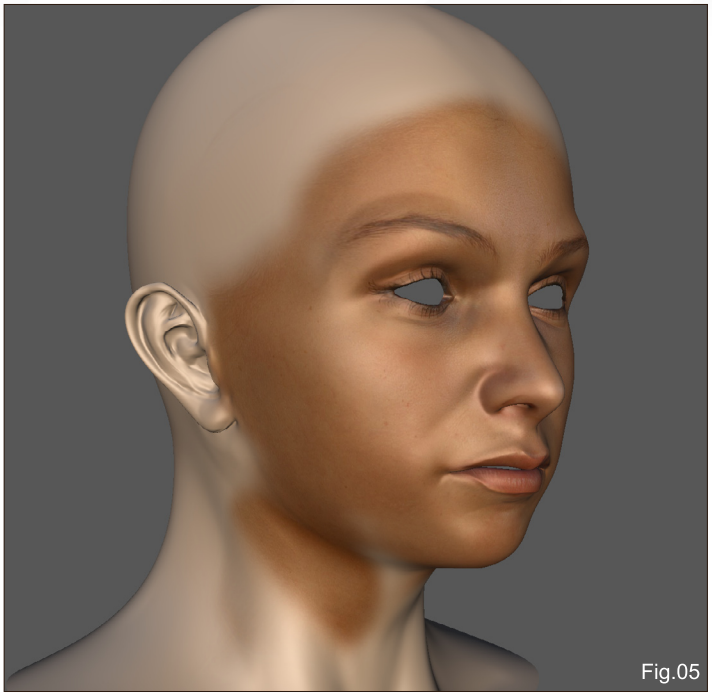
Fig.05

6. Re-size this weighted area (colored green) by hovering over the bone until you see a small gray sphere. You can then translate the size of your weighted area using your mouse buttons.
7. Switch back to a sculpting tool to finalize the result. This is now locked to your layer and will propagate to your other subdivision levels. It can also be controlled by fading this layer in the future while in the level you created it.

I then bring in my reference sheet. This allows me to check the shapes and forms of the sculpture as well as enable me to use it for part of my texturing process. Now I don't use photos for the complete process, and in this case only for the face area. The rest I hand paint, mainly as I find it far easier than balancing different projections and color matching each. Don't worry; it's not as scary as it sounds.

Texturing

For my texture for this girl, I use two high resolution photos: a front shot and a three-quarter view. I am concentrating on the face only and ignoring the rest as this will be painted by hand later on in the process (**Fig.04**). It is feasible to texture this way using only a single photo, and either the Clone brush, or hand painting any offending areas if they need it.

The face is where the majority of the user's interest will lie, so while you can paint the face texture by hand (which I've done many times), sometimes it makes just as much sense to use a good photo (**Fig.05**). When picking a photo to use as a projection stencil in Mudbox (or any other application), always ensure that you have the minimum amount of shadows baked into that image. Ideally you want an even tone as the shadows are added later by our lights.

Although painting in shadows can give excellent results, it is not only technically incorrect, but it means that when our model is lit, you are limited to certain lighting and shots (**Fig.06**). It's best to let our lights and shaders do the work to make it look real at rendering time.

Once I have a couple of separate texture layers (one for my front shot projection texture and another for my three-quarter view projection texture), I then create a new layer that I fill with a solid color picked from those photo textures (**Fig.07**). One tip is to make sure that you are in a flat viewport mode (that is in your right-click menu in the viewport) to make sure that you pick the color you want without any light or shading interfering with it (**Fig.08**). We will use this as our base for hand painting the rest of the color map.

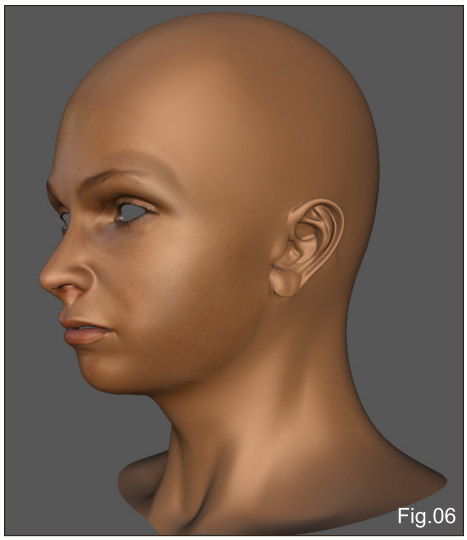
Fig.06


Fig.07

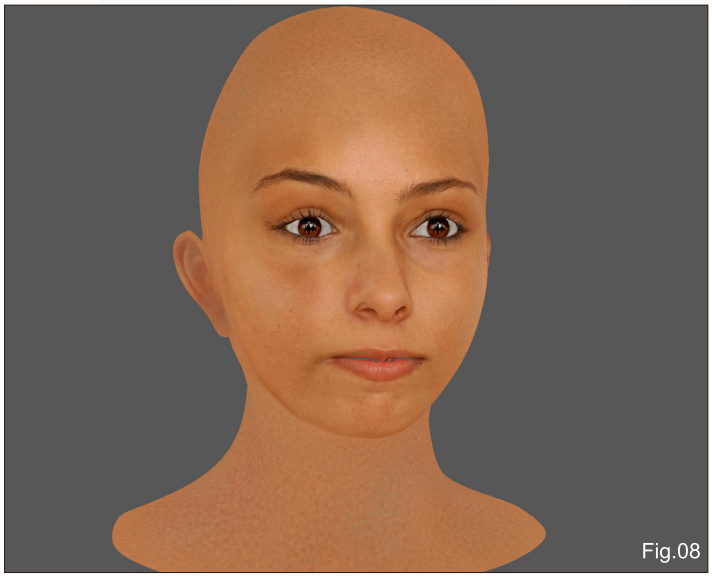
Fig.08


Fig.09

I probably have more stamps and stencils I've created over the years for use in Mudbox than any man alive, but I only need a handful unless it's for a specific job. Probably one of my most useful is a very simple stamp with a number of dots on it. To me that one stamp image is priceless! I'll include it here for you to use, but I do urge you to make your own as it is a major part of your texturing style. If everyone uses the same brush sets there is a real danger of every texture looking similar. To make your own simply create a 512x 512px image with transparency in Photoshop, and then paint a few dots on it in white. Remember that for a Mudbox stamp, it uses the white areas as the "main stamp" for painting. It's the direct opposite to a Photoshop brush, which use the black areas.

The basic workflow for painting the rest of the skin is, in its simplest form, painting lots of scattered dots of various sizes and colors to mimic the existing skin texture from our photos (**Fig.09**). To see exactly what I mean, watch the videos as it is far clearer than trying to explain it in words. Most of the color choices are instinctive to me as I've been doing this for a long time. Keep to tones within the skin photos, although you can add a desaturated blue and often a green as well to keep it looking "real" (See Video 2 in the downloadable movie resource folder).


Fig.10

Re-sculpting to texture

After the texturing stage I then do a minimal re-sculpt to ensure that the sculpt matches my texture, and finally I correct any further problem areas. It's important to get our basic female skin texture and sculpture stage correct as this is the base that everything else hinges on. I should also add that I am using one of the default Mudbox skin shaders that ship with 2011 to help me preview how things will look when it's applied to the SSS Skin shader.

Texture Tweaks

Once I am happy everything matches, I go over the whole texture using the Clone brush or simply sampling the color near it and painting over using a brush. This allows me to correct any problem areas caused by accidently projecting an area I don't want.

Before painting any tattoos onto the texture I want to make sure I have an excellent base to work from (**Fig.10**). I also generate an Ambient Occlusion map for my highest level, set this to

a blend mode of Multiply and fade it back until things look right (See Video 3 in downloadable movie resource folder).

TATTOOS AND PIERCINGS

The tattoos are painted on by doing a search for tattoos in Google and picking something that looks half decent. I use these as a stencil, set my brush color to a dark desaturated blue and adjust this layer until I feel it looks right. Do not merge all you texture layers just yet as we will need them later. As I don't have either tattoos or piercings I'm sort of in the dark a little here, so if I've got sizes of any of the relevant piercings wrong (and I'd not be the least bit surprised if I have) then my apologies.

The piercings are made in 3d Max by simply creating torus and a sphere and attaching the sphere to the torus in what I hope is the right place (**Fig.11**). The bars are made the same way; the studs such as the one in the chin and smaller ones in the nose I use a cylinder for (See Video 4 in the downloadable movie resource folder).

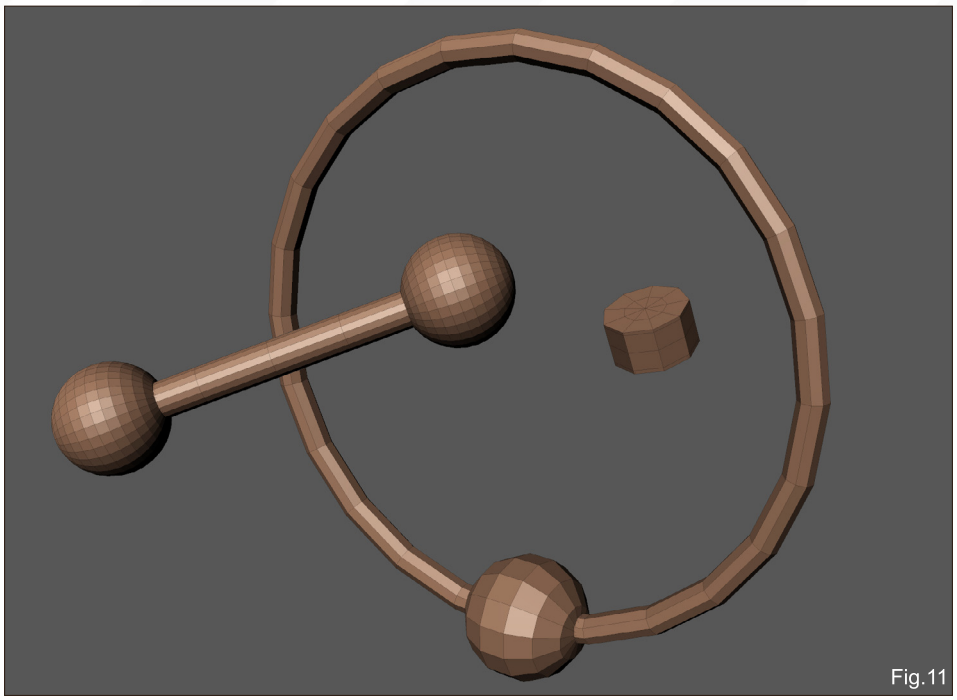

Fig.11

Wayne's Top Tip #1: So although you can go and add these in one by one in Mudbox and place them, that's going to take you a long time. So there has to be a better way, right? Well in fact there is. I import the parts one by one and save each one just after I've imported it by selecting it (using the Object brush) and hitting Export Selected in the file menu. I save these to the following location so that they then appear on the model list on the next start up of Mudbox: My Documents/ Mudbox/ 2011-x64/Data/ Meshes

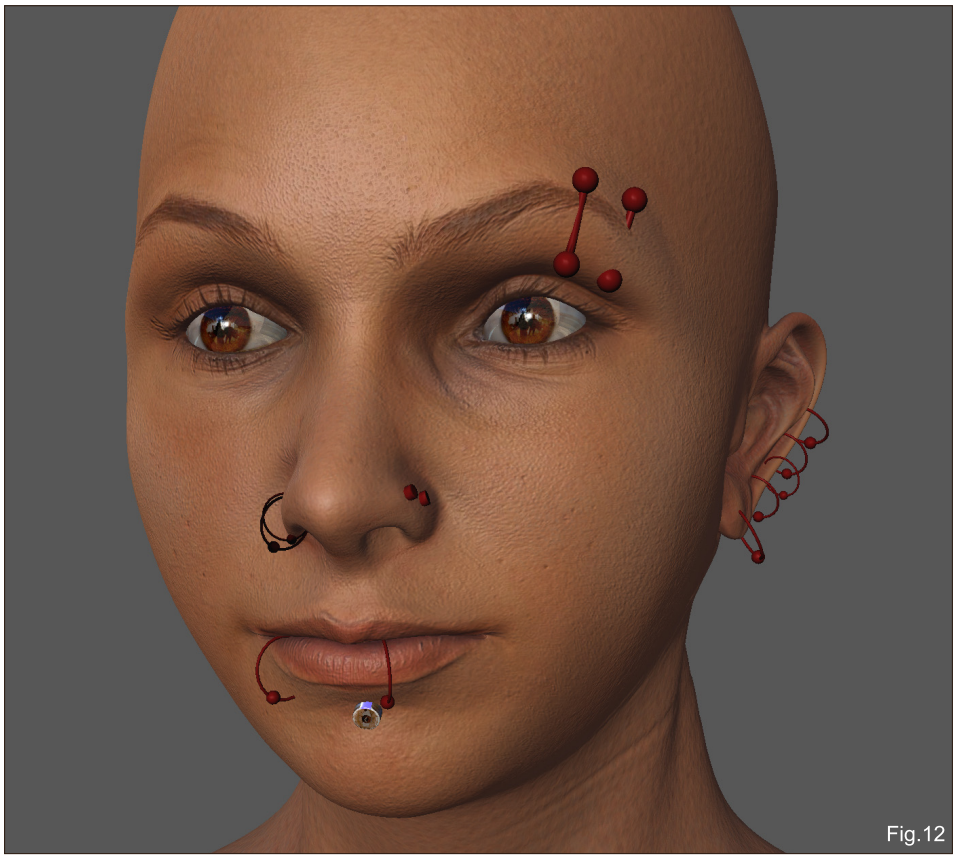

Fig.12

Wayne's Top Tip #2: Ok, you're probably thinking that last tip is ok, but it still doesn't solve the issue of placement of the parts. A little known hotkey for Mudbox exists that very few people either realise is there or even bother to try, let alone use. Holding down the "X" key then lets you move, scale or rotate the model that is currently under our brush. Let that sink in a moment.... and then try it. You'll find it is a far faster way to move, rotate and scale a lot of items in your scene in a far more intuitive way than using your traditional move, scale and rotate buttons.

So in this way I place all the objects in the scene (I show a small section of this in the video) and make sure each one has an easy to see color to stop it getting lost against the skin. I then lock all these and sculpt the small areas where there would be some pressure against the skin where the piercings enter their holes (**Fig.12**). (See Video 5 in downloadable movie resource folder).

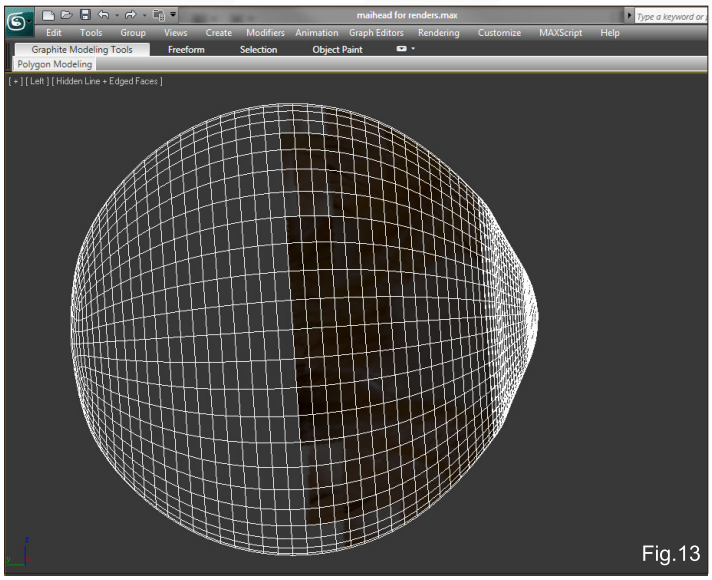
Fig.13

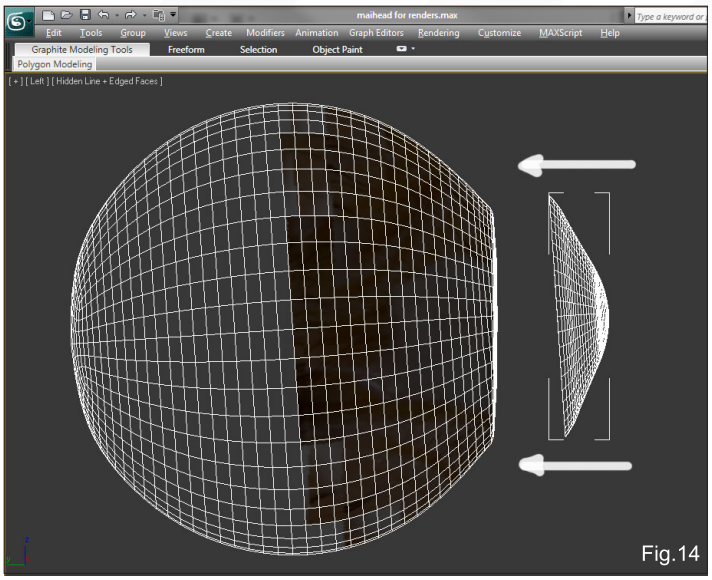
Fig.14

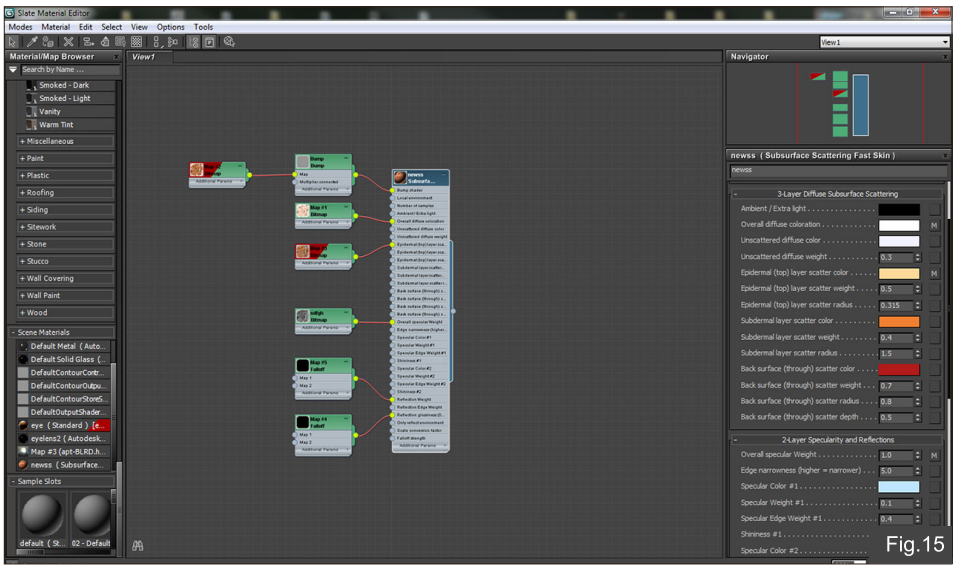
Fig.15

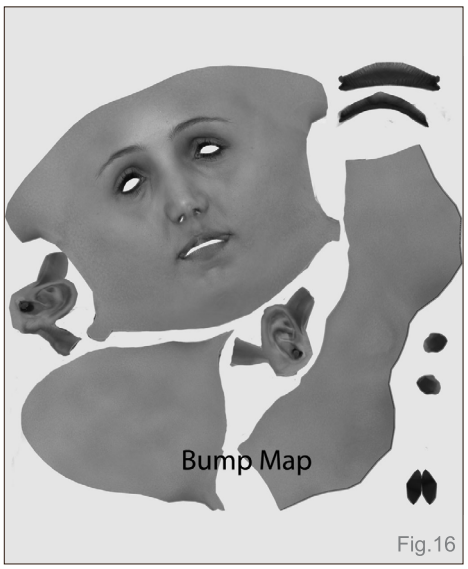

Fig.16

EYES

As I've said many times before, and no doubt will say many more times in the future, the eyes are important and they can make or break your render. I poly model the main eye shape, complete with lens, and then duplicate this. This duplicate I make very slightly larger than the original and this will have clear glass shader on it. I then delete everything that is not the lens part of the eye from this duplicate (**Fig.13**).

At render time I then flatten the iris portion of this eye before I render it out. You'll find that the placement of the iris matters a lot, as does having something nice for the eye to reflect, whether that be a map or an image mapped to a plane (**Fig.14**).

"LIGHTS ... CAMERA... RENDER!"

The lighting setup for this is a simple three point setup with no Final Gather etc. I set the key (*main light*) to the top left at about 45 degrees, and a fill at a similar angle but lower to the right. The rim light I stick behind and to the right to catch a nice rim. I decide on the rim's position only after I have locked down the angle I am going to render from. I use the real time viewport feedback in 3ds Max to help with this and use a standard gray shader until I am happy with my lighting balance.

Subsurface SSS skin is nearly a series of articles on its own, so while there's not space to go in depth into the subject I can give you a few pointers that will hopefully help a lot.

The mental ray fast Skin SSS shader is scale dependant. Your model's scale will affect how it works "out of the box". Always set your shader up initially and tweak without textures and with all your lights present; this means you can rattle through the setup of it far faster while you're testing your scene (**Fig.15**). I use the color map we painted in Mudbox once as it is, and once nearly totally white where I have overlaid the tattoo texture layer, so that it gets information from the overall color channel as well.

The diffuse is used as our bump map (**Fig.16**) and a totally desaturated version is used as our spec map (**Fig.17**). I go over the eyes, cheeks and lips with the Dodge brush in Photoshop to ensure these areas look correct (**Fig.18**).

Everything else for the render is covered in the video. For the metal parts I use one of the stock metal shaders that ship with 3ds Max.

HAIR

I use 3ds Max's Hair and Fur modifier for the girl's hair. Yes, I know I've mentioned many times how much I hate setting up hair, but alas this character really does need "proper" hair. So I'll bite the bullet and get down to it. While I'm not a "hair guru" I'll outline how I approach it.

I duplicate a number of sections from the head mesh (**Fig.19**), each an individual mesh, and grow the hair from each one. This has the advantage that firstly it is far faster to test one section rather than the whole head, and

Fig.17

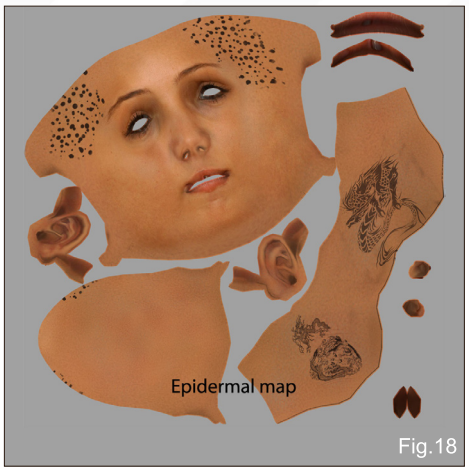

Fig.18

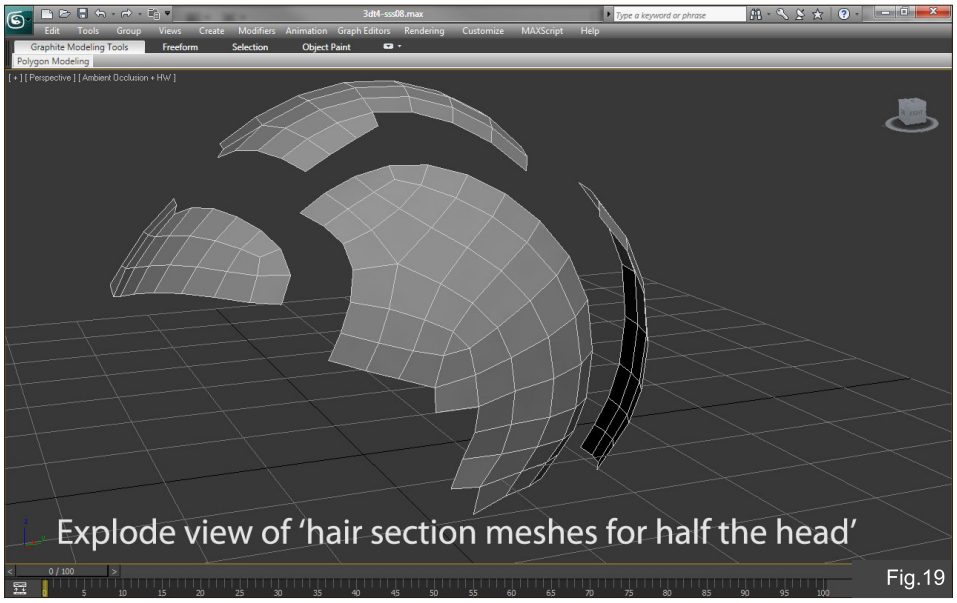

Fig.19

Fig.20

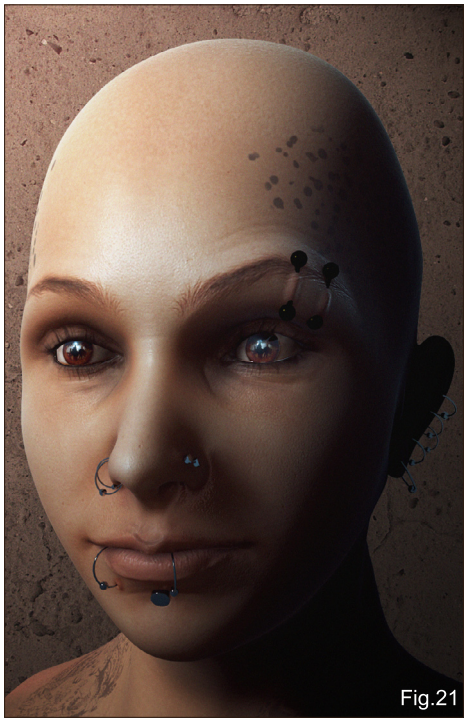
Fig.21

secondly that it's far easier to handle it that way. I render out my hair as a separate pass and use the 3ds Max Scanline renderer for this. Mainly because matching it in a single pass in metal ray was turning me into a screaming idiot! (**Fig.20**).

This also enables me to color correct the hair in post to test some colors out. I settle on red as it suits her well and it also helps to stop her looking like a young Julia Roberts on crack. I then do some basic color correction in post and add a simple background using the Gradient tool in Photoshop (**Fig.20**).

JOB DONE

I rarely do the standard female head that becomes popular from time to time in 3D. Mainly as the thought of hair puts me off and there is very little to the sculpting and texturing to get "into". It would have been possible to take this image to the next level easily by rendering out in passes and compositing and correcting later. If you wanted to push it even further you could add "proper" eyelashes and hair for her eyebrows. But as this article is already over its length I think that I made the right choice to leave things here.

Next in this series is something completely different again and we are approaching the topics that are a bit closer to my heart as a sculptor. Hopefully this article has served two purposes: to show that a realistic female head isn't unobtainable and that I don't just sculpt monsters and aliens from the planet Zog. I'll leave you with the final version and also the shot as I prefer it, without the piercings, tattoos and hair (**Fig.21**).

Wayne Robson

For more from this artist visit:

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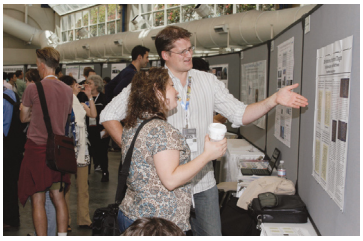

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INTRODUCTION TO RIGGING

The aim of these tutorials is to show and explain how you might tackle rigging your 3D character for animation. These tutorials will give help and advice to novices and experts who are looking to build on their rigging skills or approach rigging for the first time. The series gives a detailed step by step guide as to how to approach rigging but also shows us how to tackle common problems and issues that regularly occur even in a professional environment. The artists will be reflecting on working in the industry as well as talking us through their individual approaches to creating the best rigs possible.

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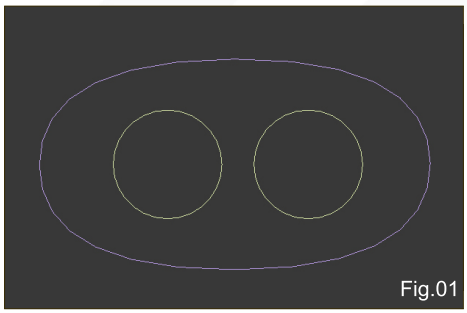
Fig.01

INTRODUCTION TO RIGGING: 4- RIG CREATION - PART 2

Software used: 3ds Max

CHAPTER OVERVIEW

Welcome to the fourth chapter of the Introduction to Rigging Tutorial Series for Max. In the previous chapter we rigged the spine, neck and head of the character. In this chapter we are going to continue with the rigging of the character - working on the eyes and the legs.

This tutorial has been done with Autodesk 3ds Max 2010, but it can be followed with previous versions of Max (until 3ds Max 7; previous versions would lack the necessary tools). If we use specific tools only available in Max 2010, we will mention it and we will explain how to make something similar with previous Max versions if needed.

During this chapter you will find the word Max scene followed by the name of the Max file. These Max scene files are provided with this tutorial and the files have been created

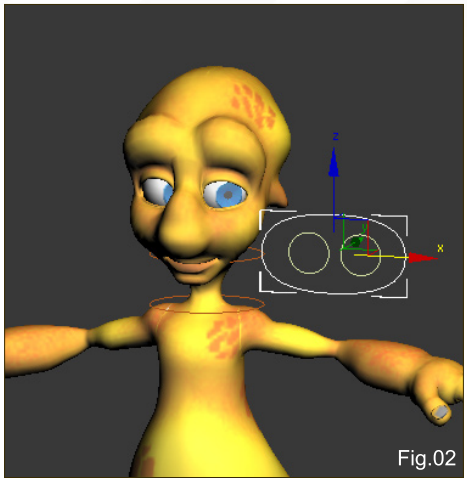
Fig.02

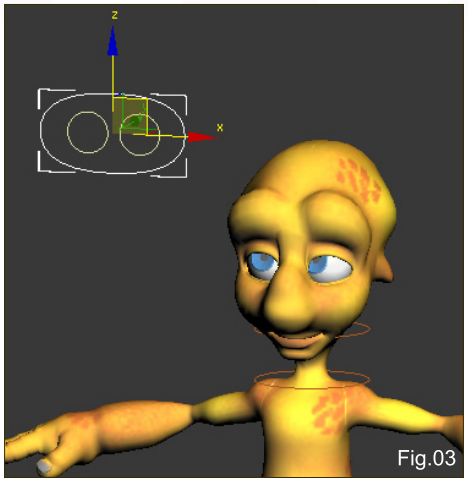
Fig.03

to illustrate the lessons. Remember to move the time slider, as a lot of them are done with animation to better illustrate the examples. The files have been created in Autodesk 3ds Max 2010 so can be opened only with this version of Max or newer ones.

As we explained in the previous chapter, we are using macroscripts; to do the installation, just follow the instructions in the previous chapter. There will be a small readme.txt that will also explain the installiation process. We are not going to explain each new macro. They will be properly explained the first time we mention each one, but agter that, we will only say to use a macro - we will not explain what it does.

EYES ANIMATION RIG

2.1 CONTROLS

For the eyes rig we have a main control that we can more to move where the eyes are looking around the scene (**Fig.01**).

Apart from the main control we have two other controls - one for each side, left and right. These two controls follow the main control, but also allow each eye to move (**Fig.02** – **03**).

The main control can have two behaviours - one follows the head movement and the other does not (**Fig.04**). Each behaviour is used for certain types of animation and the animator will choose what behaviour he needs for each animation (**Fig.05**).

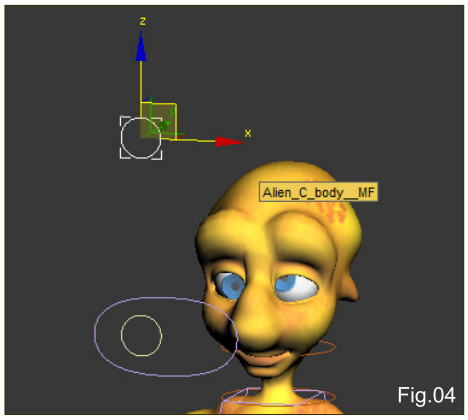

Fig.04

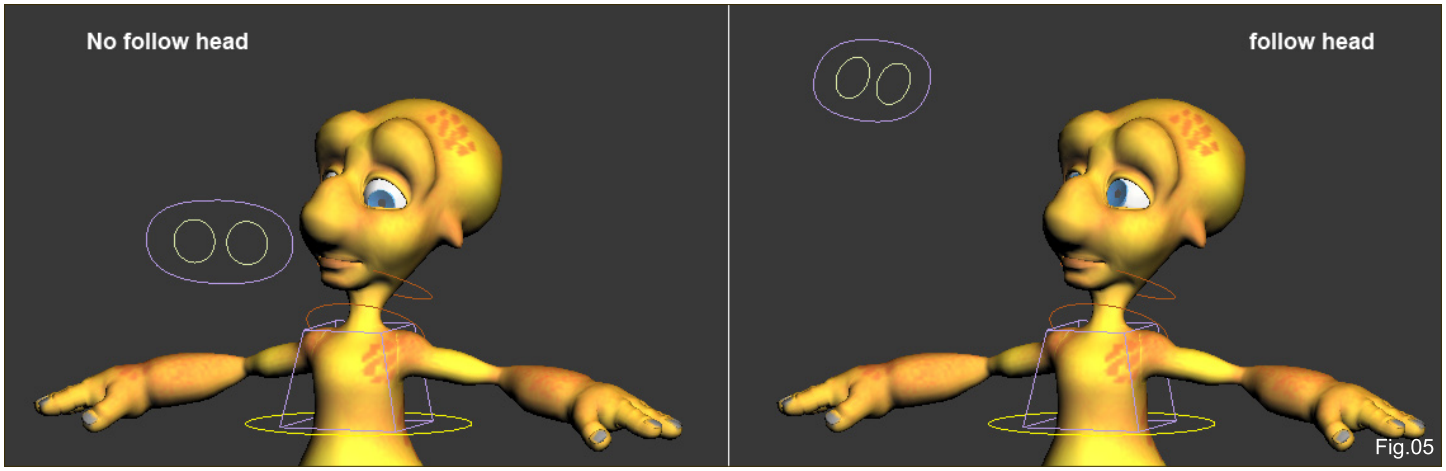

Fig.05

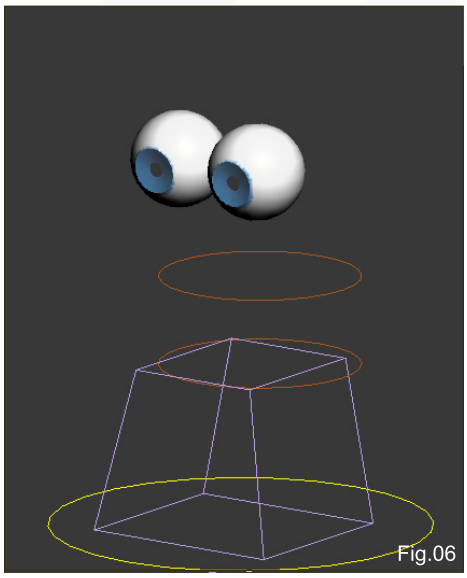
Fig.06

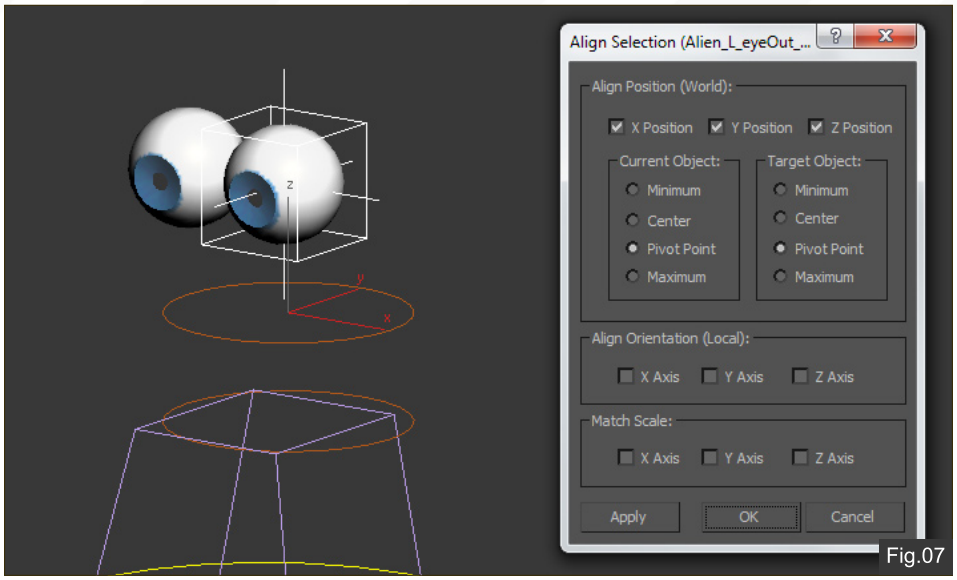

Fig.07

2.2 Creation of Eyes Rig

Open Maxfile: 1_alien_eyes_01.max to start.

Note: Make sure that our active layer is set to 0 (default) so that all the new objects we create will go to the initial layer. We can move them later on.

Note: Start all the objects names for the eyes with "Alien_C_Eyes" , "Alien_L_Eyes" or "Alien_R_Eyes". This allows us to do a selection of Alien_*_eyes* to quickly select the eyes system.

I recommend hiding the body, teeth and tongue to work on the eyes rig; we can unhide them later when we finish the rig (**Fig.06**).

1) Create a point and align and link it to Alien_C_head__SA. Name the point Alien_L_eyes_lookat__DH. Then align it in position only to the left eye geometry mesh (**Fig.07**).

2) Duplicate the point and change its X position value in world coordinates (**Fig.08**).

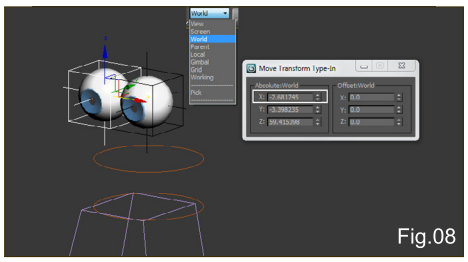
Fig.08

You have to rename the object. Use a name that will be similar to the other point's name but that changes the side - from Alien_L_eyes_lookat__DH to Alien_R_eyes_lookat__DH. We will have lots of object that are on the left and on the right and re-typing a similar name would be time consuming. To avoid that we want a tool that can quickly rename the objects and paste in the new name. The IMR macro *Dialog name* will allow you to copy a name and paste the new names. I use this tool all the time for naming. You can copy and paste and then paste inverse a name – it will paste the same name with the side inverted (**Fig.09**).

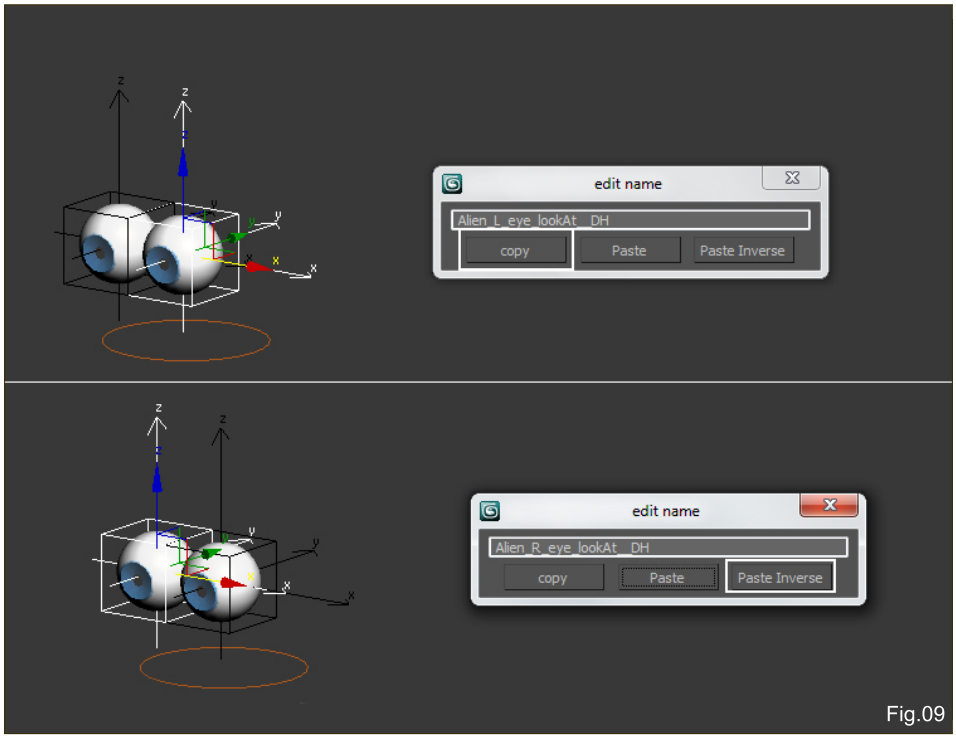

Fig.09

The good thing is that this tool can be placed in any position on the screen and does not need to go to the name field in the corner of screen. To text field is also much longer and makes it easy to read names.

3) Clone the point again, put its X value to 0 and move it closer to the front of the character. Name the cloned point Alien_C_eyes_HeadFollow__DH.

There are two *Look At* points. Activate the checkbox for axis tripod - this will help show where the *Look At* points are pointing (**Fig.10**).

4) Create another point, align it to the Alien_C_eyes_HeadFollow__DH and name it Alien_C_eyes_WorldFollow__DH. Then link it to the master of the rig Alien_C_master__SA.

5) Create a spline circle and align and parent it to Alien_C_eyes_WorldFollow__DH. The circle will not be facing the rig direction so convert it to edit spline and modify it until you are happy. Then name the circle Alien_C_eyes__SA (**Fig.11**).

6) Create another circle and align and parent it to Alien_C_eyes__SA. Convert it to editable spline and rotate it in vertex mode. Check the value in world coordinates of the X position from Alien_L_eye_lookAt__DH and copy it to the circle. Name it Alien_L_eyes__SA (**Fig.12**).

7) Duplicate the circle and invert its X value to negative. We can use the IMR macro ***Dialog name*** to paste the symmetric name Alien_R_eyes__SA.

8) At this stage we have all the objects we need for the eyes setup. We only need to connect to them. We can modify the Alien_C_eyes__SA shape in vertex mode too (**Fig.13**).

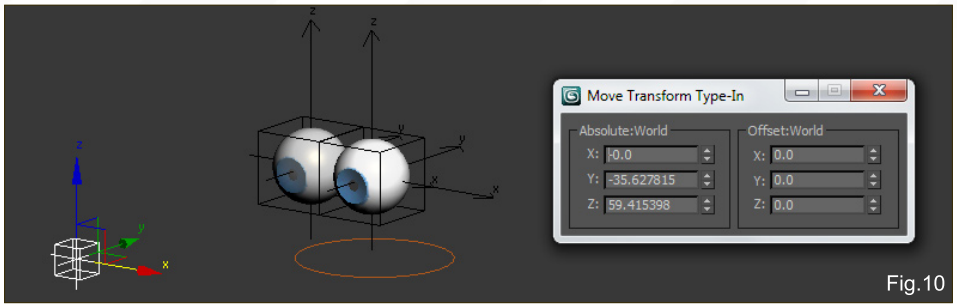

Fig.10

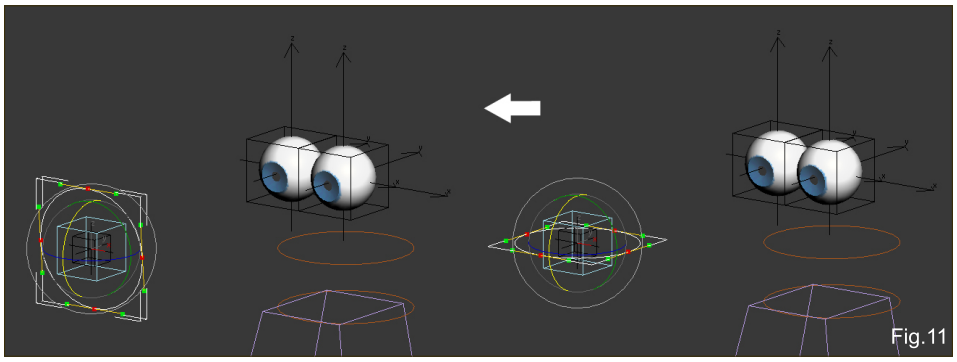
Fig.11

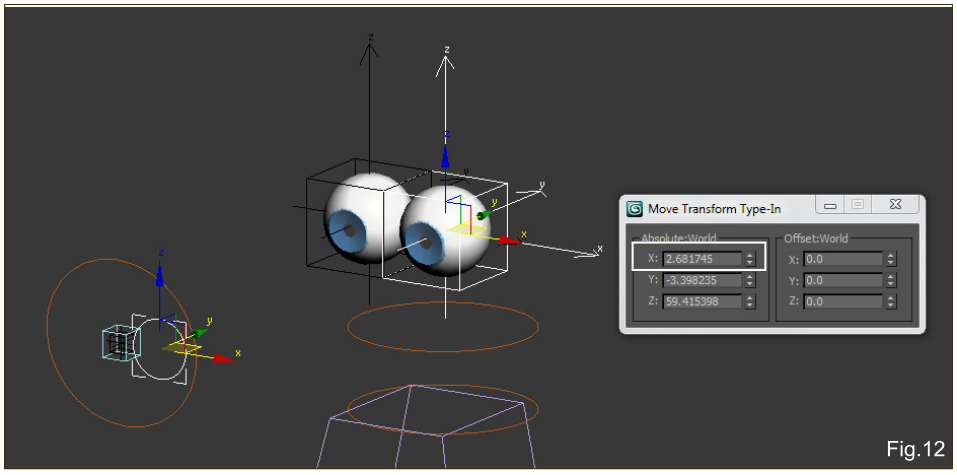

Fig.12

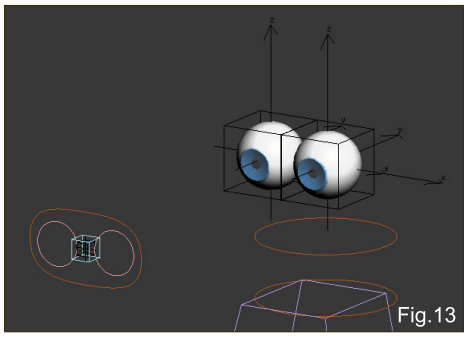
Fig.13

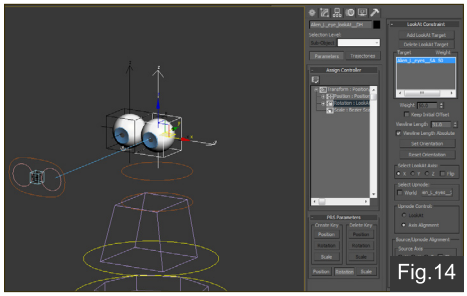
Fig.14

Open Maxfile: 2_alien_eyes_02.max.

9) Apply a *LookAt* constrain to Alien_L_eye_lookAt__DH. The target will be Alien_L_eyes__SA and the upnode will be Alien_L_eyes__SA (**Fig.14**).

10) Do the same with Alien_R_eye_lookAt__DH, applying a *LookAt* constrain to Alien_R_eyes__SA

11) Link Alien_L_eyeOut__MF, Alien_L_eye_In__MF and Alien_L_eyePupil__MF to Alien_L_eye_lookAt__DH

12) Same with the geometry for the other eye. Link Alien_R_eyeOut__MF, Alien_R_eye_In__MF and Alien_R_eyePupil__MF to Alien_R_eye_lookAt__DH.

13) Move Alien_C_eyes__SA, Alien_R_eyes__SA, Alien_L_eyes__SA and the eyes will follow. Apply the IMR macro ***position list*** to Alien_R_eyes__SA, Alien_L_eyes__SA so we can go back to their original position once the objects have been moved.

14) Configure a different wirecolor for the controls to make them easier to distinguish - yellow for the central one, blue for the left and green for the right (**Fig.15**).

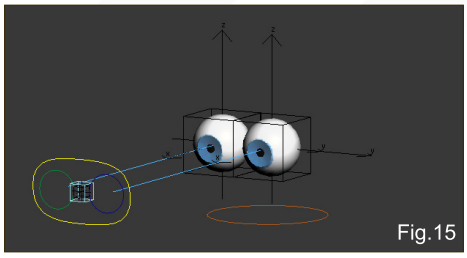
Fig.15

Open Maxfile: 2_alien_eyes_03.max.

15) Add the modifier *Attribute Holder* to the main control Alien_C_eyes__SA. After that, open the script Eyes_Attributes_ApplyCA.ms that comes with the files for this chapter. Be sure you select the control and execute function by using the keys Ctrl + E or the menu options in the script editor. This script will add the attributes to the attribute holder (**Fig.16**).

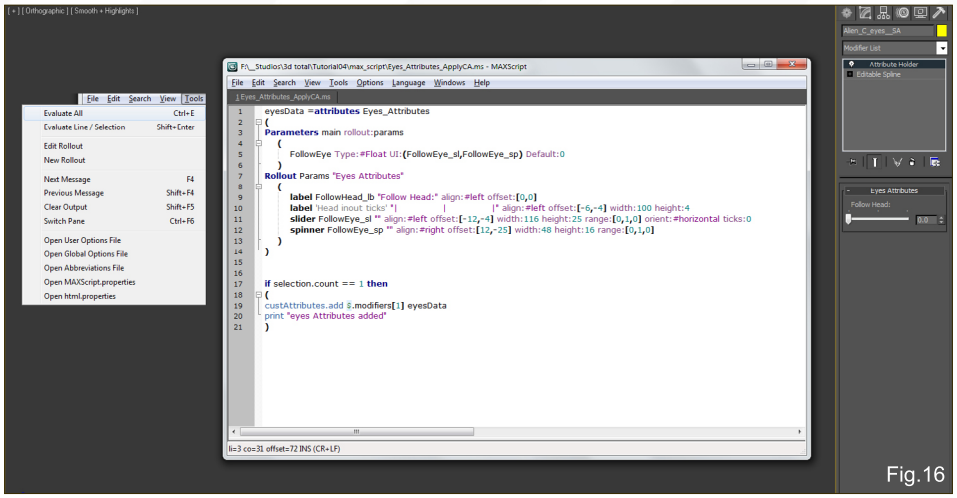
Fig.16

16) We can use Animation > Parameter Editor to add attributes, but using maxscript is a much easier and powerful way of doing it.

I will explain the relation between the code and the attributes we just created. I will do this the first time and for the rest of objects we have to add attributes to (**Fig.17**).

We have the attributes in Attributes Eyes > Attributes, and inside it we have two important parts - the parameters and the Rollout.

Parameters is linked to the Trackview and receives keys when we animate the attribute holder. Each parameter will be related to one element or more in the rollout, and we define this with UI. In this case the followEye will be connected to the spinner and to the slider.

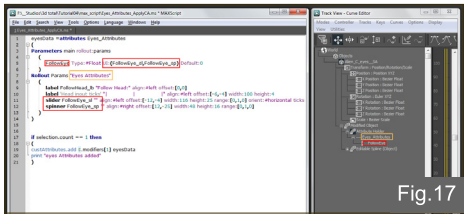
Fig.17

Rollout is how we will visually see the attributes in the modifier panel. In the image I have set up each part of the rollout in different colors. Remember that by having set up followEye in parameters with UI for FollowEye_SL and Follow_Eye_sp, they share the same controller and when I change one the other will change (**Fig.18**).

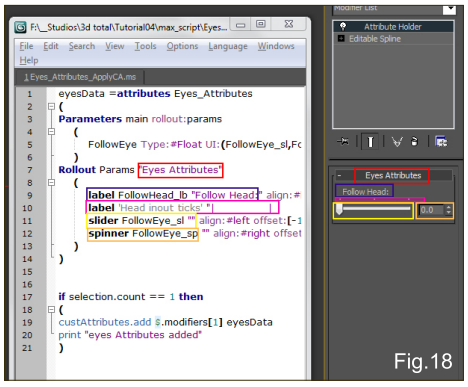
Fig.18

Now we have almost everything set up. We have to set up the behaviours when following or not following the head. If we rotate the neck control we will see how the eyes stay in place and Alien_C_eyes_Follow__DH follows the head movement (**Fig.19**).

To achieve the desired movement, make Alien_C_eyes_Parent__DH follow or not to follow Alien_C_eyes_Follow__DH.

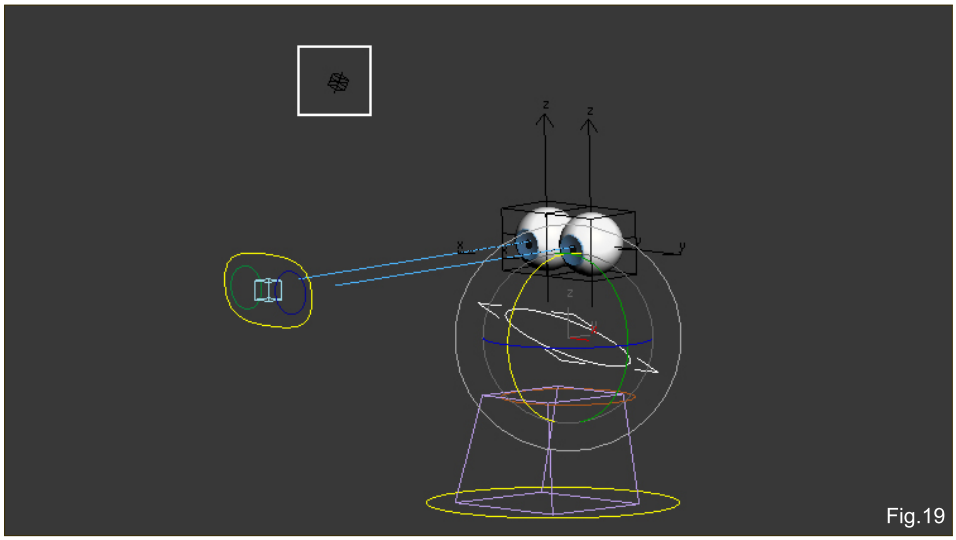
Fig.19

17) Add a position list controller and a rotation list controller to the object Alien_C_eyes_Parent__DH and in the second list put a position constrain to Alien_C_eyes_Follow__DH and an orientation constrain to Alien_C_eyes_Follow__DH (**Fig.20**).

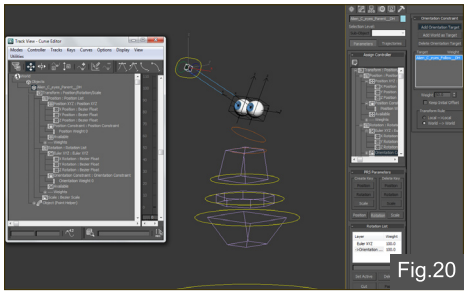
Fig.20

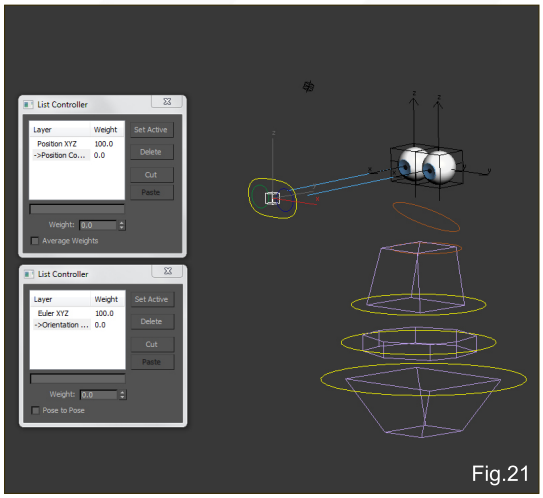

Fig.21

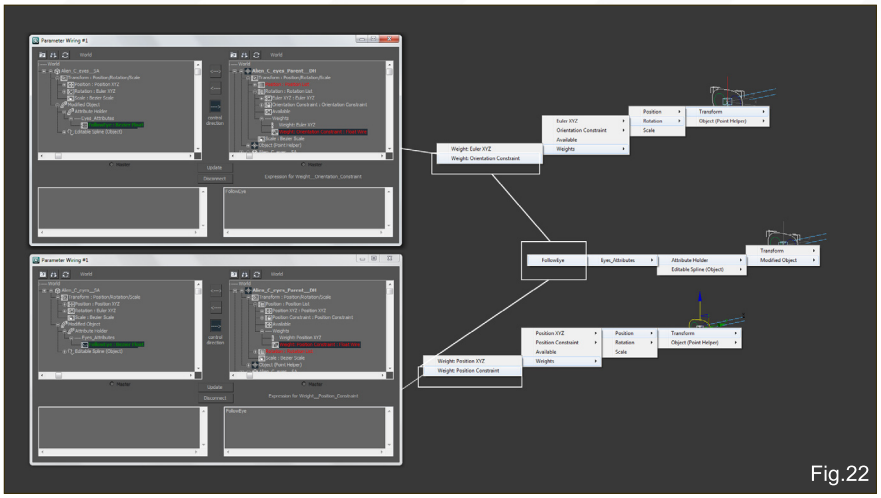
Fig.22

18) Now Alien_C_eyes_Parent__DH follows Alien_C_eyes_Follow__DH, but we can make it stop following it. To do so set the weight of the constrain to 0 as show in the image. Asking the animators to do this can cause trouble for them, so wire the weight to the attribute we just created (**Fig.21**).

19) Wiring the controllers weight to the Follow attribute in Alien_C_eyes__SA, means if we move the slider from 0 to 1 we will make Alien_C_eyes__SA follow (**Fig.22**).

20) Rename the modifier attribute holder to Eyes_Attributes to make things clear.

21) Finally clone Alien_L_eye_In__MF and Alien_R_eye_In__MF and rename as Alien_L_eye_In__PF and Alien_R_eye_In__MF. The reason for this is to have a proxy eyes in the layer proxy.

Open Maxfile: 2_alien_eyes_04.max to be at this stage.

2.3 Checklist for Eyes Rig

Before we move on to another part of the rig it is good to do a checklist. There are always too many things to remember to check. Using the same checklist will make things easier.

1) Proper names
2) Proper names for the layers
3) Objects in their correct layers
4) No object in layer 0
5) No duplicates names
6) All the meshes follow correctly
7) Controls have correct rotation orders
8) Limited keyability in controls and proper locks
9) Rotate and move the rig with autokey to check all is ok
10) Delete keys and leave a clean version for animators
11) IMR keytools zero all works properly

We will not elaborate on all the points above, only the most important.

3) Objects in their correct layers

Remember to use "*__*H" to move objects to the hidden layers, "*__SA" to move objects to the controls layers and "*__PF" to move objects to the proxy layer

8) Limited keyability in controls and proper locks

Alien_C_eyes__SA is only keyable in position and is locked in rotation and scale.
Alien_L_eye__SA is only keyable in position and is locked in rotation and scale.
Alien_R_eye__SA is only keyable in position and is locked in rotation and scale.

11) IMR keytools zero all works properly

Make sure IMR keytools zero all works properly with the controls.

Open Maxfile: 2_alien_eyes_05.max.

Leg Animation Rig

3.1 Bones

We just need four bones for each leg, one for each main area: thigh, calf, foot and toes.

In reality a leg has more bones but simplification helps the rig, and with these four bones we can achieve what is needed (**Fig.23**).

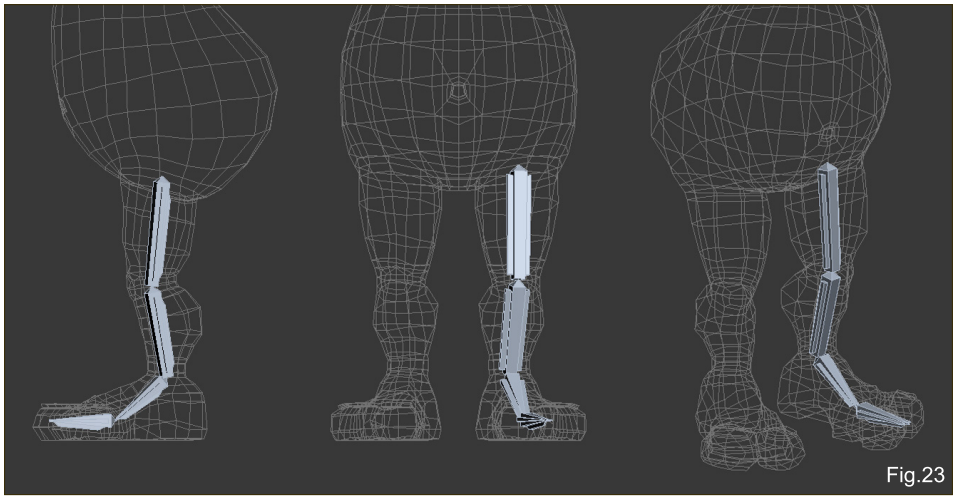
Fig.23

3.2 CONTROLS

For the leg controls we have to have a difference between IK and FK, and we will use an attribute to blend in between both.

FK

Only rotating objects can achieve the desired poses. We will have FK controls for the thigh, calf, foot and toes (**Fig.24**).

IK

The main control in the IK system is the IK control for the foot to move and rotate it. We can change the position of the leg and foot. It has attributes to control the rolls for the foot and a parameter for changing from FK to IK (**Fig.25**).

The other control is the IK swivel target, which means the knee of the left leg will always be looking at the control. We use this control together with the IK main control (**Fig.26**).

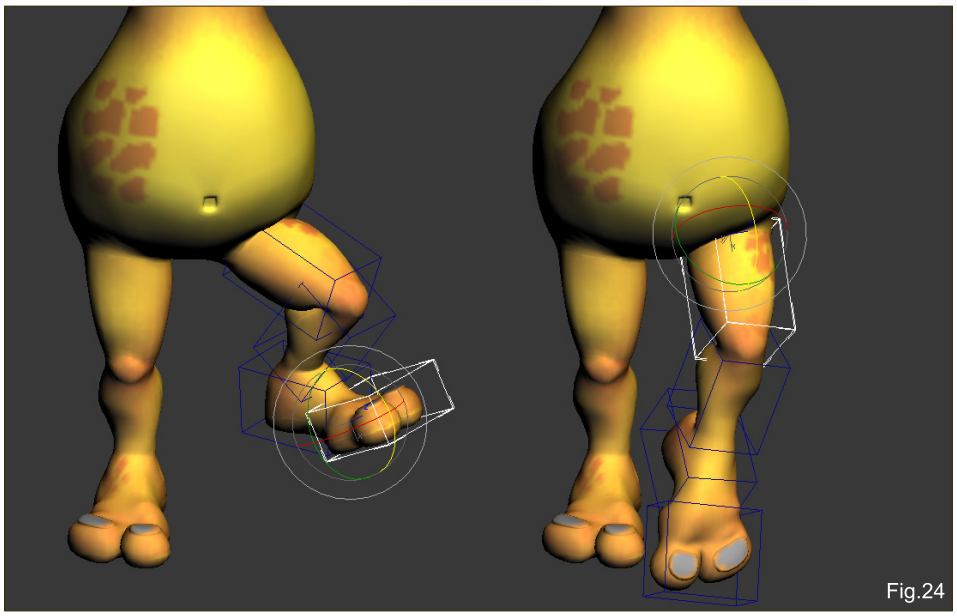
Fig.24

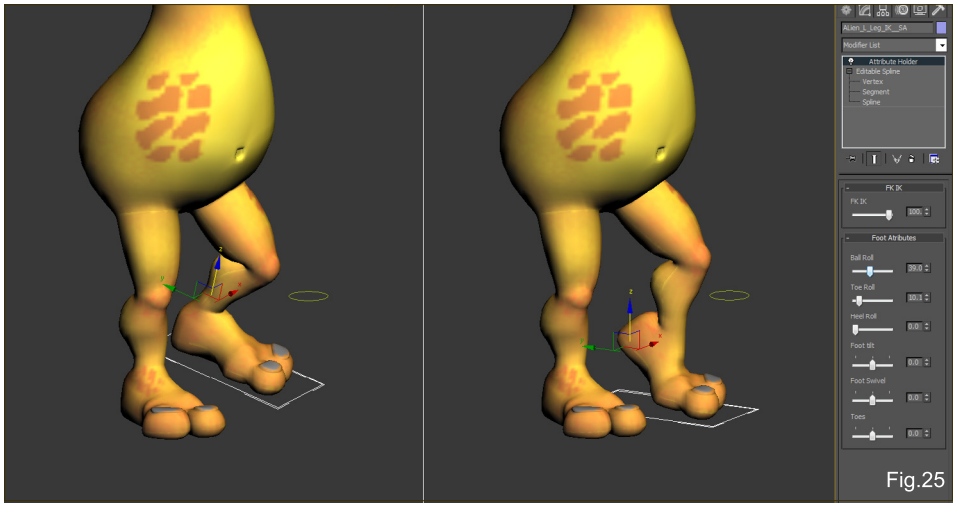
Fig.25

3.3 FK/IK THREE CHAINS SYSTEM AND TWO CHAINS SYSTEM.

The normal setup a lot of people use is the three chains system - one chain is FK, a second chain is IK and a third chain blends between FK/IK (**Fig.27**).

Open Maxfile: 3Chain_FKIK.max to see the three chain system. In the file on the FK/IK text you will get a slider to change from FK to the IK chain. If you move the time slider you will see a small animation sample.

The problem with this system is that it suffers from the same issue as orientation constrain does with two targets: the blend objects will flip when the difference between the local axis of the targets is bigger than 180 degrees.

To fix this we canmake a two chain FK IK only, and make the FK follow the IK when needed. So firstly we will learn how to make an IK chain and a FK chain, and then we will learn how to connect the FK to the IK.


Fig.26

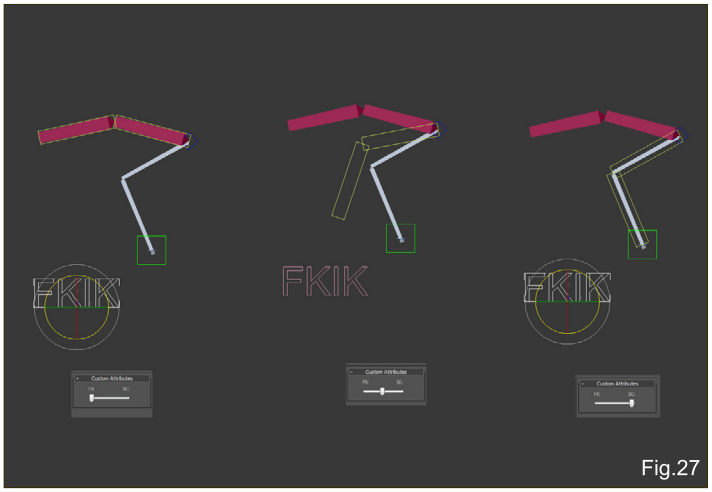

Fig.27

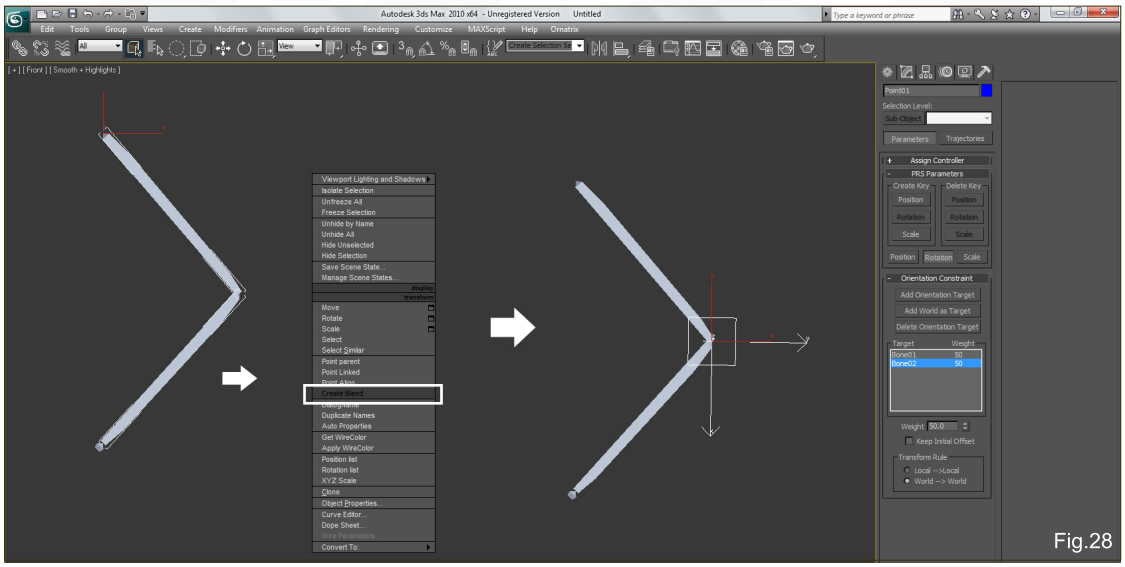
Fig.28

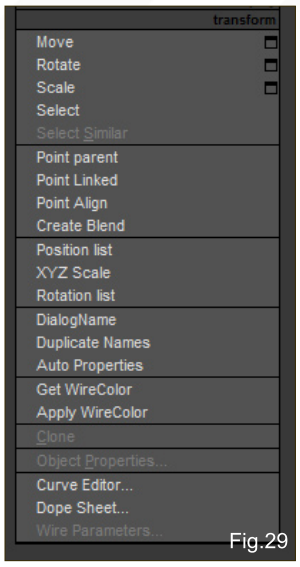

Fig.29

3.4 Creation of the Leg Rig IK

There are a lot of repetitive processes when we rig and I have created four scripts to simplify the task. From this lesson forward we are going to use them all the time; they will be under the category IMR.

Point Parent - Creates a point aligned to every object selected; the newly created point will be the parent of the selected object.

Point Linked - Creates a point aligned to every object selected; the newly created point will be the child of the selected object

Point Align - Creates a point aligned to every object selected.

Create Blend - To make this script work we need to select two objects. This will create a point that will be linked to one of the two objects of the selection. The two objects that are related the created point will be linked to the children, and after that create an orientation constrain between the two objects. Make the point axis tripod to help visualize the blend (**Fig.28**).

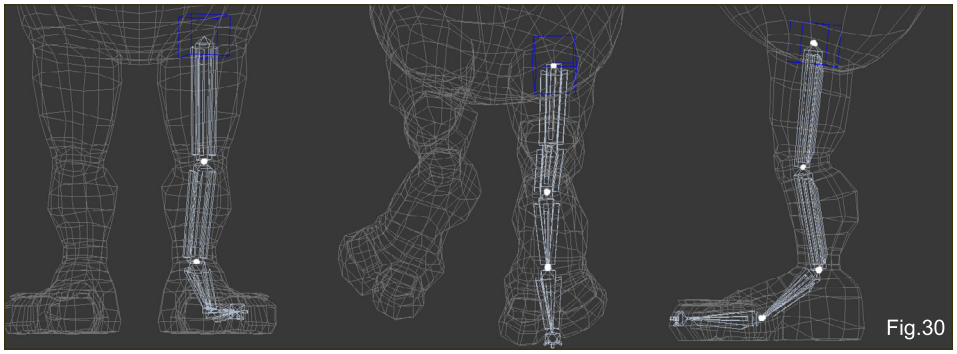
Fig.30

These are simple scripts but will automate repetitive tasks and make the process more efficient. I recommend adding the macros to your quad. The use of separators can help you to organize them properly (**Fig.29**).

Open Maxfile: 2_alien_eyes_05.max to be in this stage.

1) We will start by creating the bones. Where we place the joints is important and it will help to achieve proper deformations.

Check the bones are centred in the middle of the mesh for each view so we can be sure the hips, knees, ankles and toes look good from all angles. Be sure to start drawing the bone chain for the right view. Once we are happy we will select the first bone and apply an IMR Point Parent (**Fig.30**).

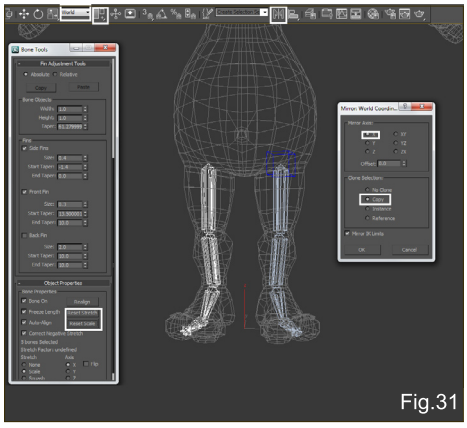
Fig.31

2) Rename the objects, starting from the point Alien_L_leg_Parent__DH, Alien_L_leg_Thigh__BH, Alien_L_leg_Calf__BH, Alien_L_leg_foot__BH, Alien_L_leg_IK_toe__BH and Alien_L_leg_end__BH.

3) Now create the bones for the other leg (Right). We could do them manually but it will not match the other side perfectly. So instead of that, use the Symmetry tool. Before using symmetry, make sure the coordinates are set in the world and the coordinates for manipulating the object are in the centre. By doing this we can make the mirror happen in the world. Copy in the X coordinates and do a copy. The Max Symmetry tool works by creating negative scales that are not good for rigging, so we use the bone tool options Reset Stretch and Reset Scale for the new objects (**Fig.31**).

Create a new point by selecting the right thigh bone and use IMR Point Parent. We can use the IMR macro *Dialog name* to copy and paste

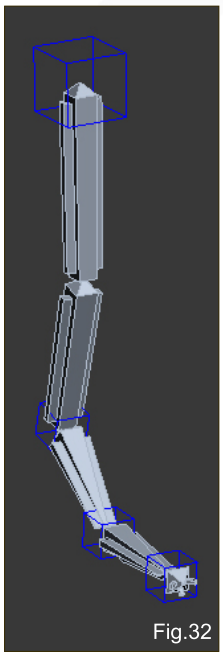
Fig.32

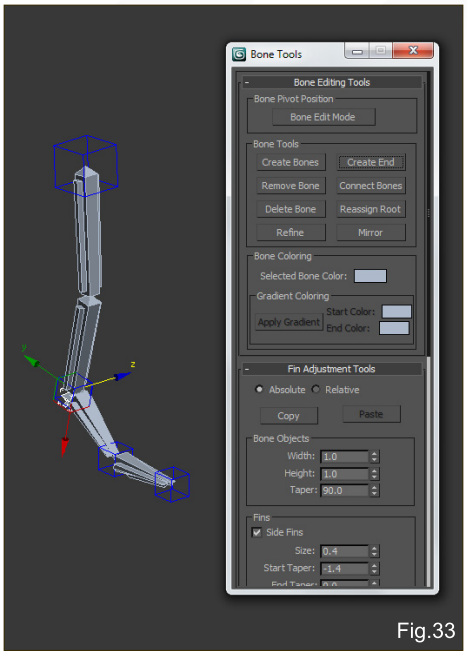

Fig.33

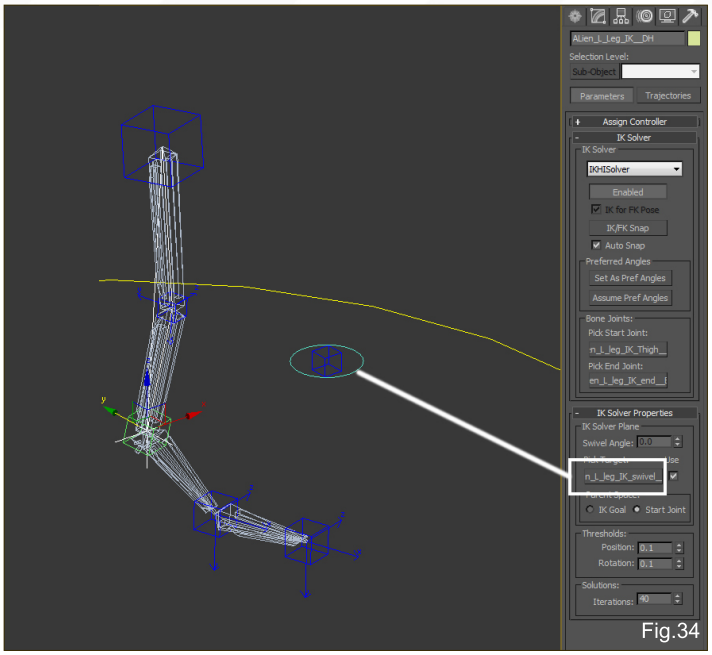

Fig.34

symmetric names from the left side to the right side.

4) There is an object named Alien_C_body__PF in the proxy layer. Select the faces for each bone and detach them. I normally do the proxy in the last stage, but in this case it will help to understand the FK and the IK system. The names will be similar to the bones but changing *__BH* for *__PF*.

Open Maxfile: 3.4_Alien_legsIKFK_01.max

5) Clone all the new bones for the legs and create a new layer called FK. This layer will be hidden and the new bones we created will be moved to the new layer. We will use these bones when we create the FK leg rigs.

6) Develop the rig for the left side of the leg. Then do the same steps to create the right side. To focus on the left side, hide the right side of the leg.

7) Add "IK_" to all the names after "_leg_" so we know that we are in the IK chain. For now all the objects we created have "_leg_IK_". A sample of changing the name would be Alien_L_leg_Thigh__BH. Be sure you do this name change in all the bones.

8) Now select the foot, the toes and the end bone and run IMR Point Align. This will create three points. Once the three points have been created, we can delete the object Alien_L_leg_end__BH (**Fig.32**).

9) Rename the new points ALien_L_Leg_IK_constrain__DH, ALien_L_Leg_IK_Ball_Roll__DH and ALien_L_Leg_IK_Toes_Target__DH. These names don't make sense right now but we will use them in the future.

10) Unlink the bone Alien_L_leg_IK_Foot__BH and select the Alien_L_leg_IK_Calf__BH with the bone tools option to create an end bone and name it Alien_L_leg_IK_end__BH (**Fig.33**).

11) Create an IK - use the menu Animation > Ink Solvers > IH solver. The IK will go from Alien_L_leg_IK_Thigh__BH to Alien_L_leg_IK_end__BH. Name the newly created IK ALien_L_Leg_IK__DH and link it to ALien_L_Leg_IK_constrain__DH.

Open Maxfile: 3.4_Alien_legsIKFK_01.max to be in this stage.

12) Select the thigh and calf bones and apply IMR Create Blend. Select the blend point and create an IMR point Align. Move the new point in local coordinates to Y. The name for the point will be Alien_L_leg_IK_swivel__DH. When you are happy with the position, use IMR Keytools and select Zero Rotation so the rotation of the object is 0,0,0. Link Alien_L_leg_IK_swivel__DH to the rig master Alien_L_leg_IK_swivel__SA.

13) Create a circle and align and parent it to Alien_L_leg_IK_swivel__DH and name the circle Alien_L_leg_IK_swivel__SA selecting the IK. In the Command panel > Motion select as Alien_L_leg_IK_swivel__SA as the swivel target. Now when we move the control Alien_L_leg_IK_swivel__SA the knee will look at it (**Fig.34**).

14) In order to create the control for the IK foot, create a spline rectangle and move and rotate it until is centred with the foot. I recommend converting the rectangle spline into an editable spline. It is useful to have the Alien_Mesh layer unhidden too. Name the spline ALien_L_Leg_IK__SA.

15) We want to have the pivot point of the control in the ankle. To do so, change Adjust the pivot, in pivot mode only and align it in position with ALien_L_Leg_IK_constrain__DH. After that, parent ALien_L_Leg_IK__SA to the rig master Alien_L_leg_IK_swivel__SA IMR position list

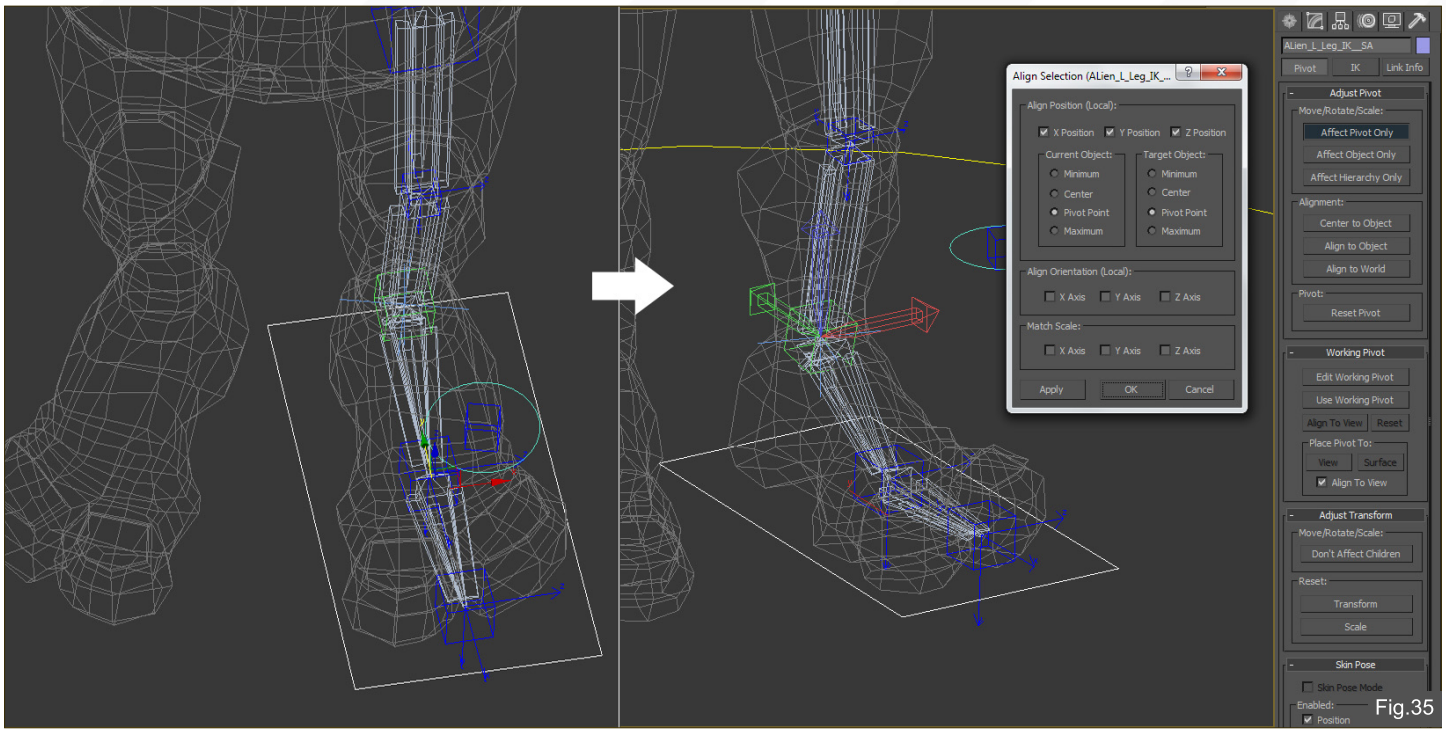

Fig.35

and an IMR rotation list to ALien_L_Leg_IK__SA (**Fig.35**).

Open Maxfile: 3.4_Alien_legsIKFK_02.max

16) Select Alien_L_leg_IK_end__BH and apply IMR point linked. Name the point Alien_L_leg_IK_foot_parent__DH.

17) Select Alien_L_leg_IK_foot_parent__DH and apply IMR point linked. Name the new point Alien_L_Leg_IK_Foot_LookAt__DH.

18) Select Alien_L_Leg_IK_Ball_Roll__DH and apply IMR point linked. Name the new point Alien_L_Leg_IK_Foot_LookAt__DH.

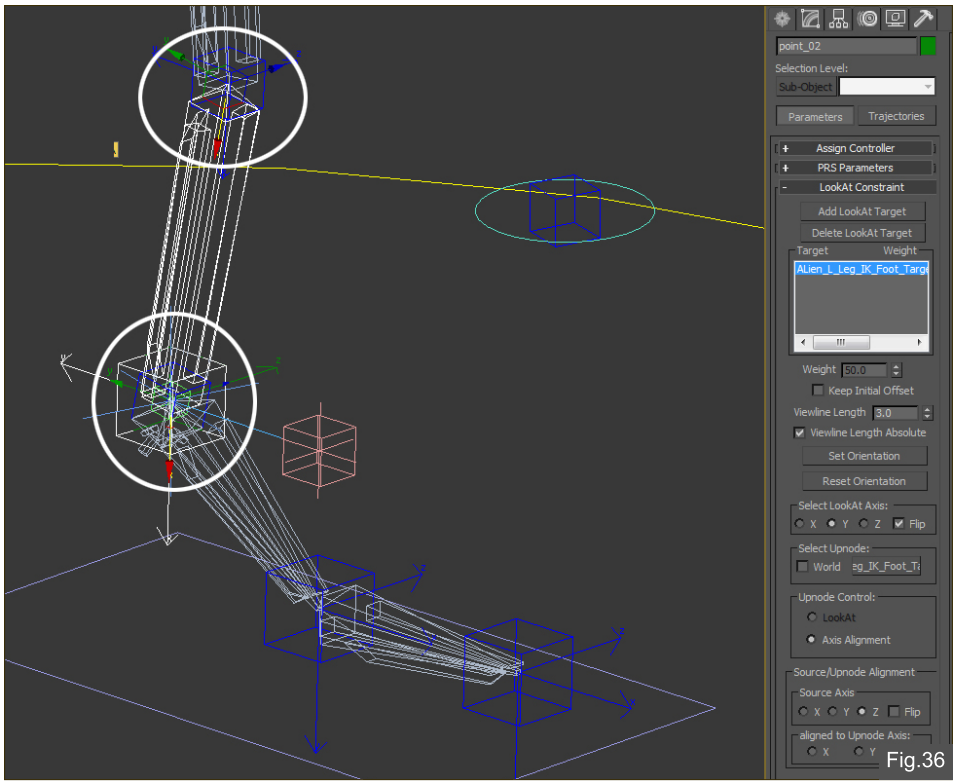

Fig.36

19) Be sure ALien_L_Leg_IK_Foot_Target__DH has the same values in Z global coordinates as ALien_L_Leg_IK_Foot_LookAt__DH.

20) Make Alien_L_Leg_IK_Foot_Target__DH pink and a cross to make it easier to see.

21) Make Alien_L_Leg_IK_Foot_LookAt__DH green and the axis tripod a bit bigger too.

22) Apply a *LookAt* constrain to Alien_L_Leg_IK_Foot_LookAt__DH, the target being ALien_L_Leg_IK_Foot_Target__DH.

23) The *LookAt* axis will be Y and flip, and the upnode Alien_L_Leg_IK_Foot_Target __DH, *Source Axis* in Z and *Upnode Axis* in Z. What we want to achieve with this is that the Alien_L_Leg_IK_Foot_LookAt__DH has the same local orientation as Alien_L_leg_IK_Calf__BH (**Fig.36**).

24) Link ALien_L_Leg_IK_constrain__DH to ALien_L_Leg_IK_Ball_Roll__DH.

25) Link Alien_L_leg_IK_Foot__BH to Alien_L_Leg_IK_Foot_LookAt__DH.

26) Now if we rotate Alien_L_Leg_IK_Ball_Roll__DH we will see how the foot reacts nicely to the ball roll but the toes don't.

Open Maxfile: 3.4_Alien_legsIKFK_03.max

27) To get the toes rotating properly we need to create a *LookAt* system similar to the one used in the foot.

Select Alien_L_leg_IK_end__BH and apply IMR Point Align. Name the point Alien_L_Leg_IK_Toes_Parent__DH.

29) Link Alien_L_Leg_IK_Toes_Parent__DH to Alien_L_Leg_IK_Foot_LookAt__DH

30) Select Alien_L_Leg_IK_Toes_Parent__DH and apply IMR Point Linked. Name the point Alien_L_Leg_IK_Toes_LookAt__DH

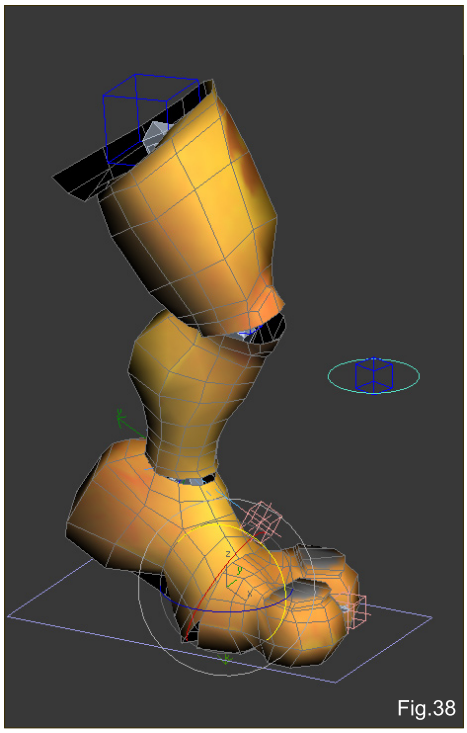
Fig.38

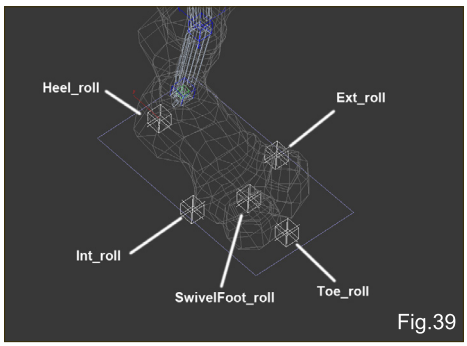

Fig.39

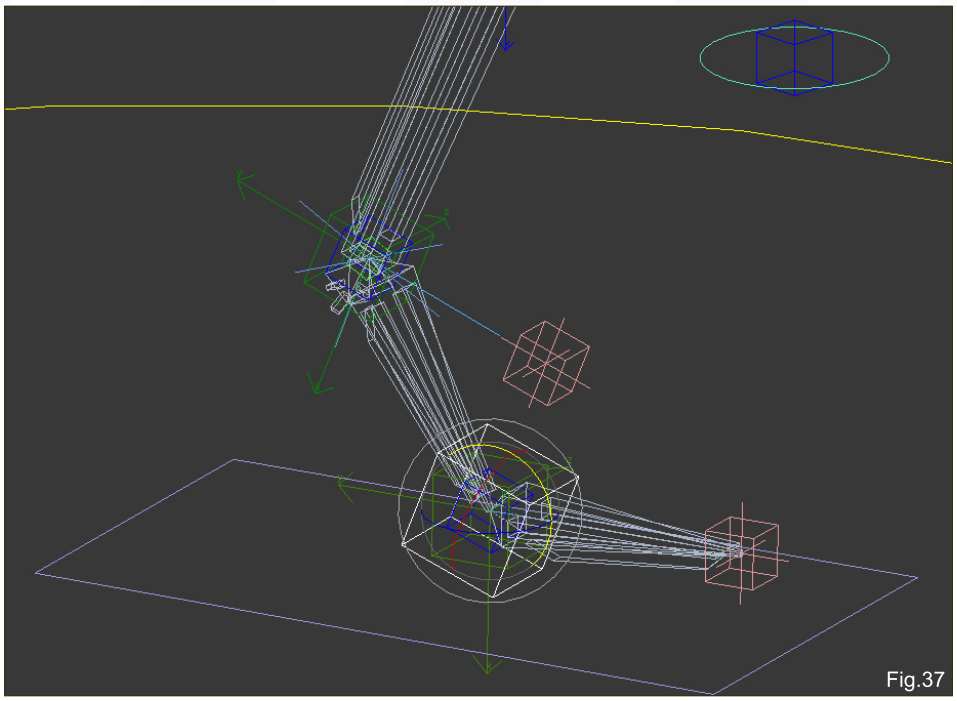
Fig.37

31) Make ALien_L_Leg_IK_Toes_Target__DH pink and add a cross to make it easier to see.

32) Make Alien_L_Leg_IK_Toes_LookAt__DH green and the axis tripod a bit bigger too.

32) Apply a *LookAt* constrain to Alien_L_Leg_IK_Toe_LookAt__DH the target will be Alien_L_Leg_IK_Toe_Target__DH.

34) The *LookAt* axis will be Y and flip, and the upnode Alien_L_Leg_IK_Toe_Target__DH; *Source Axis* in Z and *Upnode Axis* in Z.

35) Link Alien_L_Leg_IK_Toes_Parent__DH to Alien_L_Leg_IK_Foot_LookAt__DH.

36) Link Alien_L_leg_IK_toe__BH to Alien_L_Leg_IK_Toe_LookAt__DH.

37) Now when we rotate Alien_L_Leg_IK_Ball_Roll__DH the toes will react properly (**Fig.37**).

Open Maxfile: 3.4_Alien_legsIKFK_04.max

38) Now we can link the proxy meshes for the legs to Alien_L_Leg_IK_Toe_LookAt__DH, Alien_L_Leg_IK_Foot_LookAt__DH, Alien_L_leg_IK_Thigh__BH and Alien_L_leg_IK_Calf__BH. This will help to identify visually the leg, and to place the rest of the roll (**Fig.38**).

39) Delete Alien_L_leg_IK_Foot__BH and Alien_L_leg_IK_Toe__BH as we don't need them. You can keep them if you want but they are not necessary for the rig to work.

40) Select Alien_L_Leg_IK__SA and apply IMR Point linked five times. Name the points ALien_L_Leg_IK_toeRoll__DH, ALien_L_Leg_IK_Int_roll__DH, ALien_L_Leg_IK_Ext_roll__DH, ALien_L_Leg_IK_swivelFoot_Roll__DH and Alien_L_Leg_IK_Heel_Roll__DH. Check the next image to see the proper placement (**Fig.39**).

41) Now we have to link the new objects, but instead using a long list, look at **Fig.40** - the arrow will show the direction of the link.

Open Maxfile: 3.4_Alien_legsIKFK_04.max

42) Rotate each of the rolls and see how the legs react. Although we have the IK leg system properly set up, the animators may have difficulty selecting it. So the best solution is to

create custom attributes in Alien_L_Leg_IK__SA and animate using this object.

43) Add the modifier Attribute Holder to the main control Alien_L_Leg_IK__SA. After that, open the script Eyes_Attributes_ApplyCA.ms that comes with the files for this chapter. Be sure you have selected the control, and execute the script using the keys Ctrl +E or the menu options in the script editor. This script will add the attributes to the attribute holder (**Fig.41**).

44) Use Wire Parameter to connect the custom attributes to the roll points. What expression follows in the wiring depends on what you type in the expression list (**Fig.42**).

45) Connect Tilt to Alien_L_Leg_IK_Int_roll__DH rotation Y expression "if tilt <= 0 then tilt else 0".

46) Connect Tilt to Alien_L_Leg_IK_Ext_roll__DH rotation Y expression "if tilt >= 0 then tilt else 0".

47) Connect FootSwivel to ALien_L_Leg_IK_swivelFoot_Roll__DH rotation Z expression "FootSwivel".

48) Connect ToeRoll to Alien_L_Leg_IK_toeRoll__DH rotation X expression "ToeRoll".

49) Connect HeelRoll to Alien_L_Leg_IK_Heel_Roll__DH rotation X expression "-HeelRool".

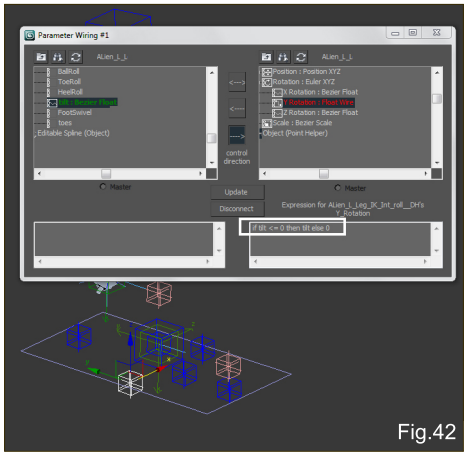
Fig.42

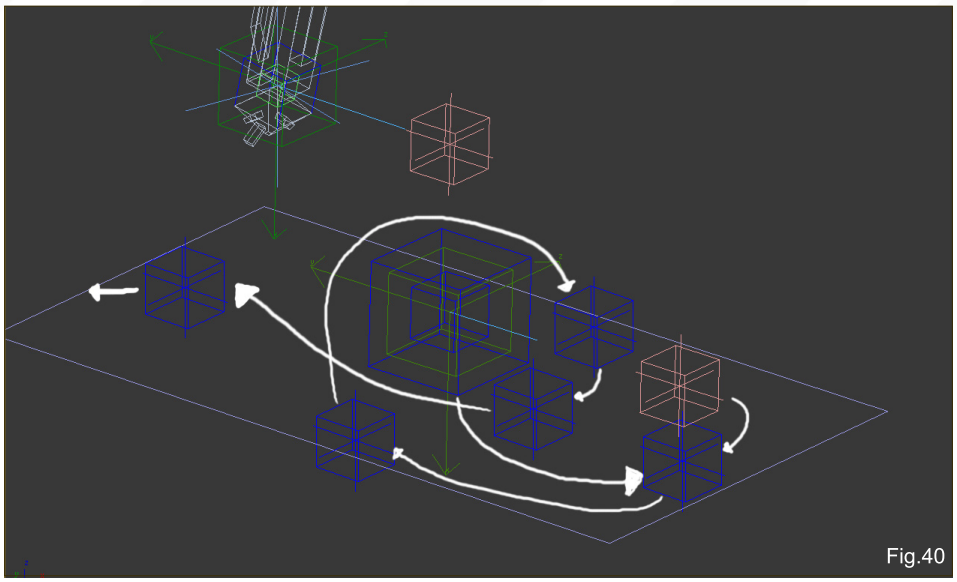
Fig.40

50) Apply an IMR Rotation List to Alien_L_Leg_IK_Ball_Roll__DH then connect BallRoll to Alien_L_Leg_IK_Ball_Roll__DH /animation/ rotation Z expression "BallRoll".

51) Before connecting the toes, select Alien_L_Leg_IK_Toe_LookAt__DH and apply IMR Point Linked. Name the new point Alien_L_Leg_IK_Toes_rot__DH. We will need another point to rotate on top of the *LookAt* to allow the toes to roll. Link Alien_L_foot_toes__PF to Alien_L_Leg_IK_Toes_rot__DH.

54) Connect the toes to Alien_L_Leg_IK_Toes_rot__DH rotation Z expression "ToeRoll".

55) The FKIK parameter will be used when we built the FK Leg Chain.

56) We have finished the IK system; now select all the objects in layer 0 and create a layer called IK. It will be easy to manage IK objects from now on.

Open Maxfile: 3.4_Alien_legsIKFK_05.max

3.5 Creation of the Leg Rig FK

1) Select Alien_L_Leg_IK_Foot_LookAt__DH and Alien_L_Leg_IK_Toe_LookAt__DH and apply a point align. Move these two new points to the layer FK and hide the layer IK, so we can focus only in the FK rig.

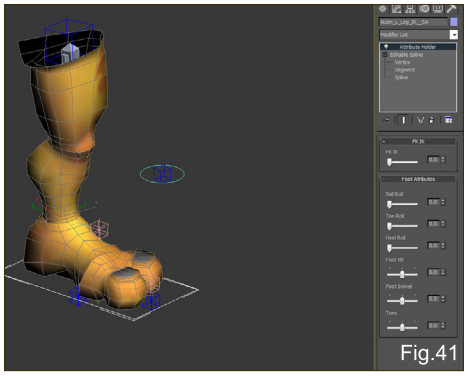
Fig.41

2) Hide the right side bones as we want to focus in the left FK side.

Open Maxfile: 3.4_Alien_legsIKFK_06.max to be in this stage.

3) We will use a similar technique we used to create the spline control for chest and hips, but this time we will use scripts to automate it. We have two new *IMR macroscripts* that we will add to the generic quad - *Bone to Box* and *Convert to Shape*.

Bone to Box will create a box aligned to the bone and with its same length. *Convert to Shape* will convert a geometry or helper to a shape.

4) Select the thigh and calf bones for the leg FK and apply *Bone to Box*.

5) Create two boxes and align them to points.

6) Convert the four new boxes to *editpoly* and modify them to fit nicely around the mesh.

Open Maxfile: 3.4_Alien_legsIKFK_07.max

7) Select the four boxes and apply ***Convert to Shape*** (**Fig.43**).

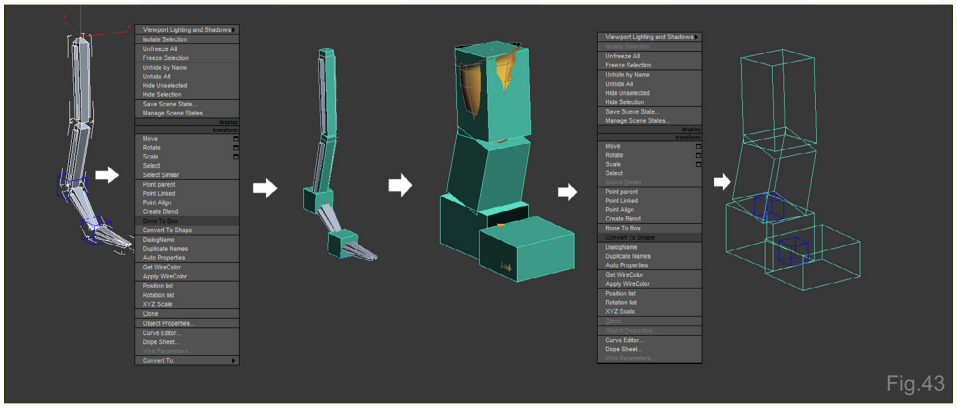
Fig.43

8) Name the splines as follows - Alien_L_leg_FK_Thigh__SA, Alien_L_Leg_FK_Calf__SA, Alien_L_Leg_FK_Foot__SA, Alien_L_Leg_FK_Toes__SA. Apply a blue wire color to the shapes.

9) Name the point Alien_L_Leg_FK_Foot__DH, Alien_L_Leg_FK_Toes__DH.

10) Organise the hierarchy as shown in (**Fig.44**), following the arrows.

11) Apply an IMR Rotation List to Alien_L_leg_FK_Thigh__SA, Alien_L_Leg_FK_Calf__SA.

12) Finally, link the proxy to the FK controls and test the rotation.

13) Now test the FK rig (**Fig.45**).

Open Maxfile: 3.4_Alien_legsIKFK_08.max.

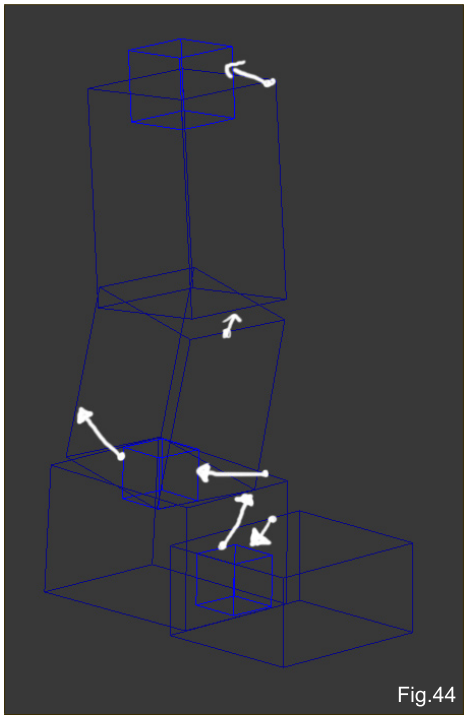
Fig.44

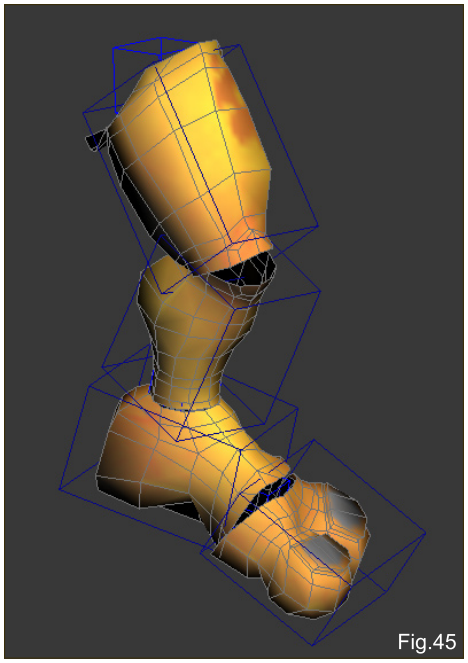
Fig.45

3.6 CONNECT THE FK RIG TO THE IK RIG

The last thing we have to do is make the FK chain follow the IK chain, but we want to be able to choose not to follow it as well. To do so we will use a combination of Orientation Constrain and a Float List. Before starting, unhide the IK layer so you can see the IK objects.

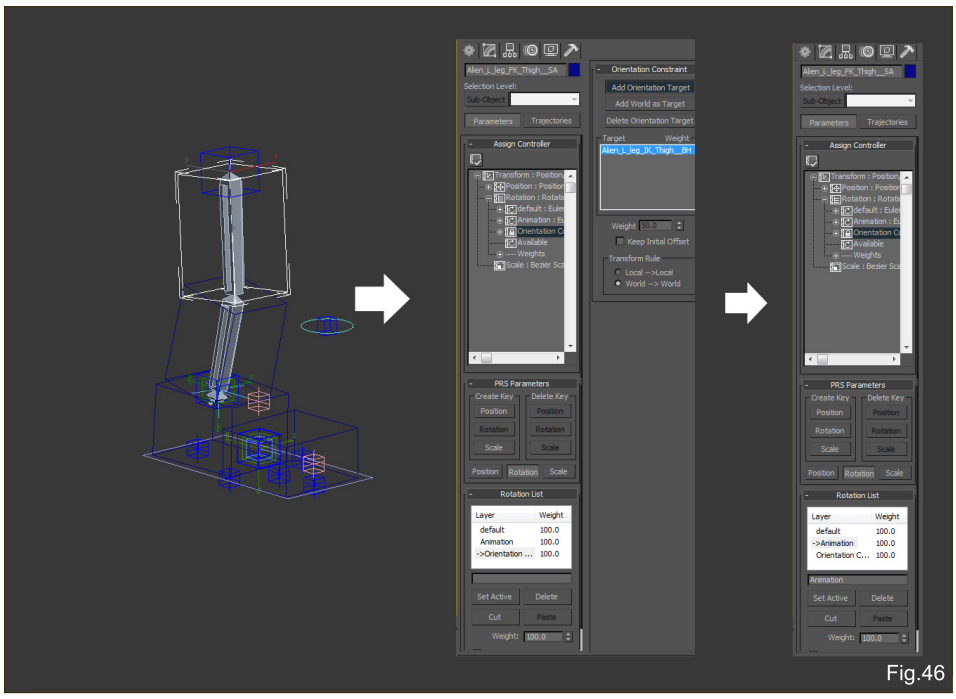
Fig.46

1) On the object Alien_L_leg_FK_Thigh__SA, on the float list of rotation add an orientation constrain to Alien_L_leg_IK_Thigh__BH.

2) Once the orientation constrain has been set up, set active to the animation on the list (**Fig.46**).

3) Repeat with Alien_L_leg_FK_Thigh__SA and add an orientation constrain to Alien_L_leg_IK_

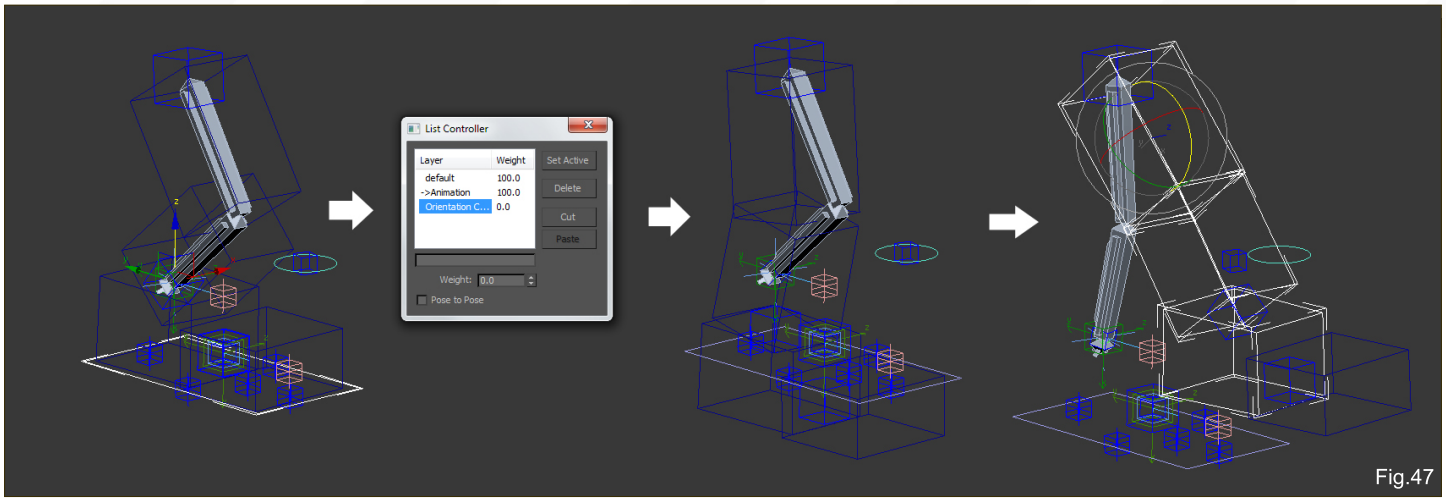

Fig.47

Calf__BH.

4) On Alien_L_Leg_FK_Foot__SA and Alien_L_Leg_FK_Toes__SA, add a rotation list and name the first on the list Animation.

5) On the rotation of the float list of the object Alien_L_Leg_FK_Foot__SA, add the available an orientation constrain to Alien_L_Leg_IK_Foot_LookAt__DH.

6) Once the orientation constrain is set up, set active to the Animation on the list.

7) On the object Alien_L_Leg_FK_Toes__SA on the float list of rotation add an orientation constrain to Alien_L_Leg_IK_Toes_rot__DH.

8) Once the orientation constrain is set up, set the active to the animation on the list

9) If we move it now the IK and the FK will follow. For each of the four FK controls we put the weight of the orientation constrain value to 0, the FK will stop following the IK. And because in the four controls the active on the list is animation we can rotate the objects (**Fig.47**).

10) Connect Alien_L_Leg_IK__SA attribute FKIK to the weight for the constrain for the four controls Alien_L_Leg_FK_Foot__SA, Alien_L_Leg_FK_Toes__SA, Alien_L_leg_FK_Thigh__SA, Alien_L_leg_FK_Calf__SA.

11) Now Alien_L_Leg_IK__SA attribute FKIK will allow you to change between FK and IK (**Fig.48**).

12) Link Alien_L_leg_Parent__DH to the control Alien_C_Spine_Hips__SA so the leg will follow the hips.

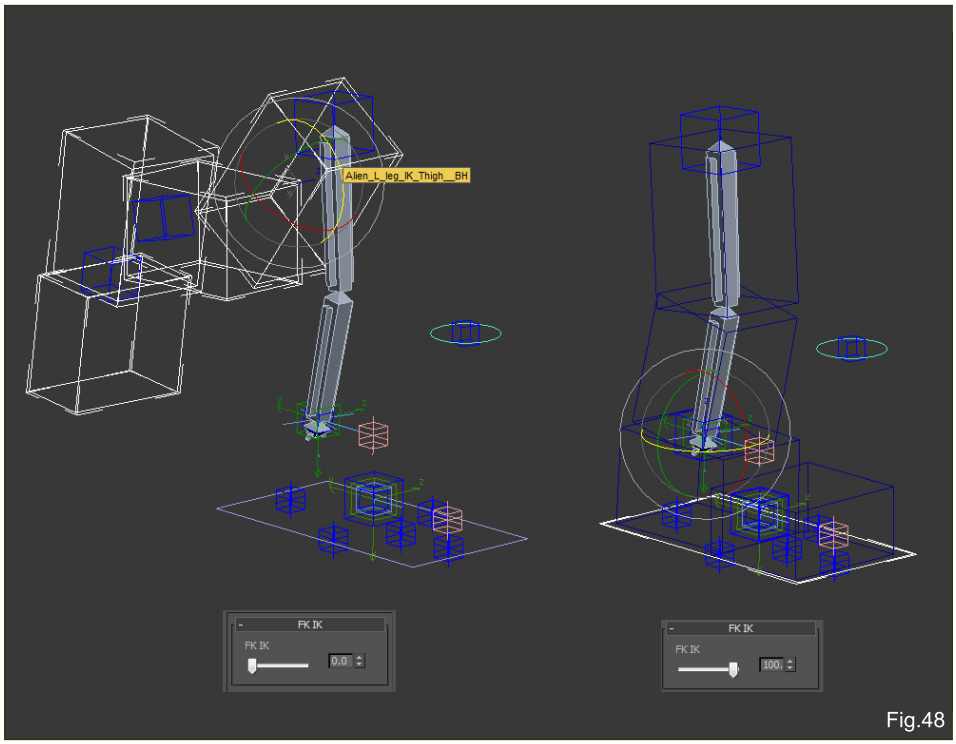

Fig.48

Open Maxfile: 3.4_Alien_legsIKFK_09.max to be in this stage.

Do the same for the rig leg following the sets from IK leg, FK leg and connect the FK rig to the IK rig.

Open Maxfile: 3.4_Alien_legsIKFK_10.max to be in this stage.

3.7 Checklist for Leg Rig

Before we move on to another part of the rig it is good to do a checklist. There are always too many things to remember to check .Using this checklist will make things easier.

1) Proper names
2) Proper names for the layers
3) Objects in their correct layers
4) No object in layer 0
5) No duplicates names
6) Check all the meshes follow correctly

7) Controls have correct rotation orders
8) Limited keyability in controls and proper locks
9) Rotate and move the rig with autokey to check all is ok
10) Delete keys and leave a clean version for animators
11) IMR keytools zero all works properly

We will not see all the points above, only the most important.

3) Objects in their correct layers
Remember to use "*leg_*__*H" to move objects to the hidden layers, "*leg_*__SA" to move objects to the controls layers and "_*Leg_*__PF" to move objects to the proxy layer. Once all the objects are moved delete FK and IK as they are not needed any more.

8) Limited keyability in controls and proper locks
Alien_L_leg_FK_Thigh__SA and Alien_R_leg_FK_Thigh__SA SA are keyable in rotation/animation and locked in position and scale.

Alien_L_leg_FK_Calf__SA and Alien_L_leg_FK_Calf__SA are keyable only in rotation/animation/z_rotation and locked in position, rotation and scale, only unlocking Z rotation.

Alien_R_Leg_FK_Foot__SA and Alien_R_Leg_FK_Foot__SA are keyable in rotation/animation and locked in position and scale.

Alien_L_leg_FK_toes__SA and Alien_R_leg_FK_toes__SA are keyable in rotation/animation and locked in position and scale.

Alien_L_Leg_IK__SA and Alien_R_Leg_IK__SA SA are keyable in position/animation and rotation/animation but locked in scale.

Alien_L_leg_IK_swivel__SA and Alien_R_leg_IK_swivel__SA are keyable in position and locked in rotation and scale.

11) Be sure that the IMR keytools zero works properly

Open Maxfile: 3.4_Alien_legsIKFK_11.max to be in this stage.

Leg Deformation Rig

4.1 Deformation Leg Rig

As we did with the animation, we will focus on one the left side and let you do the right side by yourself.

Because the FK rig is the one that follows the IK, we will build the deformation rig following the FK rig.

1) Unhide a few objects from the layer Alien_hidden to start working on the deformation rig. These objects are Alien_L_leg_Parent__DH, Alien_L_Leg_FK_Foot__DH, and the two bones for the foot and the toes Alien_L_leg_toe__BH and Alien_L_leg_foot__BH. Hide the controls for the upper part of the rig to have only the objects needed on screen (**Fig.49**).

Open Maxfile: 4.3_Alien_deformationRig_01.max to be in this stage.

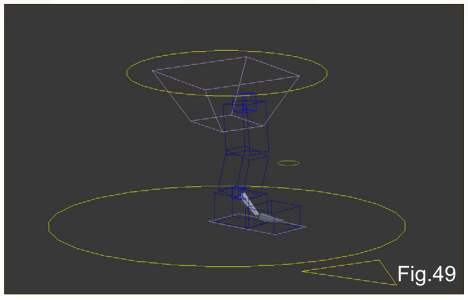
Fig.49

2) Link Alien_L_leg_foot__BH to Alien_L_Leg_FK_Foot__SA. Then rename Alien_L_leg_foot__BH to Alien_L_leg_foot_sk__BH.

3) Link Alien_L_leg_toe__BH to Alien_L_Leg_FK_toes__SA. Then rename Alien_L_leg_toe__BH to Alien_L_leg_toe_sk__BH.

4) Move and rotate Alien_L_leg_foot_sk__BH to be aligned to Alien_L_leg_toe_sk__BH and centre it in the middle of Alien_L_Leg_FK_Foot__SA. This will help the enveloping.

5) Create three twist bones for the calf and for the thigh. The three bones will have to be the same length; it is best to do this numerically. To know the length of Alien_L_leg_FK_Thigh__SA we can see the value its first child Alien_L_leg_FK_Calf__SA. The value of X in the default channel will be 8.375708.

Create four points using IMR Point Linked. Put the X value for the points 0 - 8.375708/3, 2 - (8.375708 /3) and 8.375708. The great thing is that the track view allows mathematical operations so we don't have to do the calculations with the windows calculator (**Fig.50**).

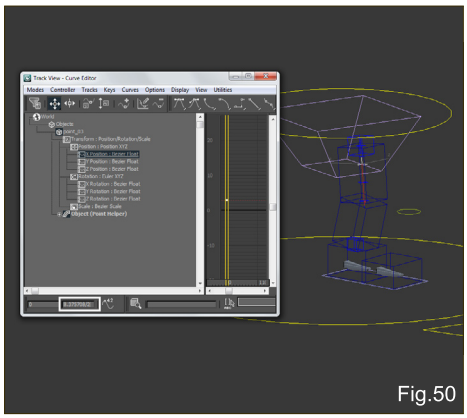
Fig.50

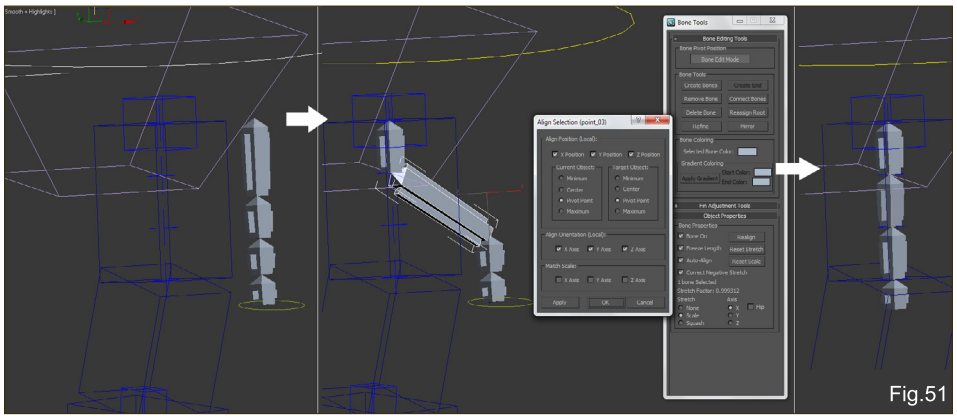
Fig.51

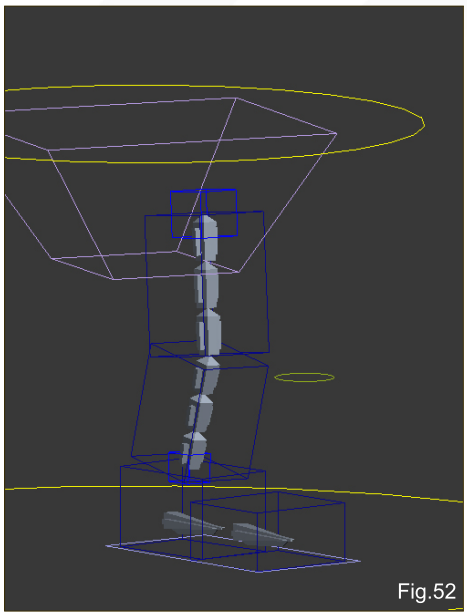
Fig.52

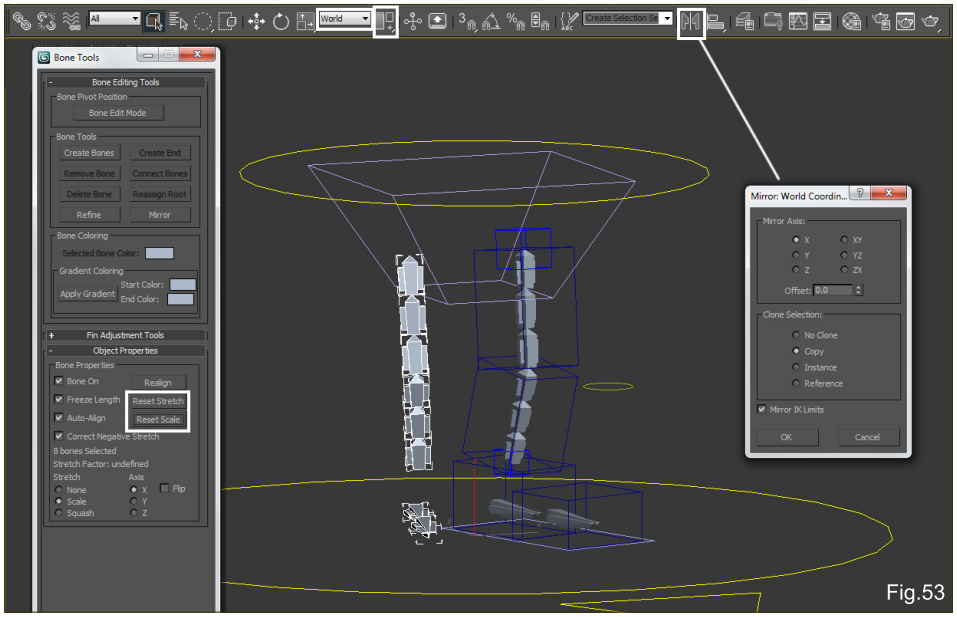
Fig.53

Create a four chain bone and use the bone tools in Edit Bone Mode, combined with the tool align to match each bone with each point we created (Fig.51).

Delete the last bone as we only need four bones to setup the length of bone number three. Name the bones Alien_L_leg_Thigh_twist01_SK__BH, Alien_L_leg_Thigh_twist02_SK__BH, Alien_L_leg_Thigh_twist03_SK__BH.

Now you can delete the four points we created to help create the three bones. And finally link the three bones to Alien_L_leg_FK_Thigh__SA.

6) Repeat the same process to create the three twist bones for the calf Alien_L_leg_FK_Calf__SA. To know the calf length, check the X value of Alien_L_Leg_FK_Foot__DH. Name the three bones Alien_L_leg_Calf_twist01_SK__BH, Alien_L_leg_ Calf _twist02_SK__BH, Alien_L_leg_ Calf _twist03_SK__BH (**Fig.52**).

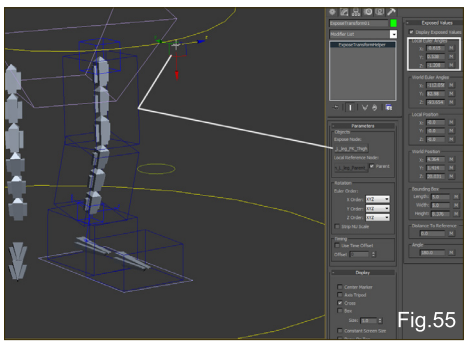
Fig.55

Open Maxfile: 4.3_Alien_deformationRig_02.max to be in this stage.

Note: If you don't want to repeat the same process to create bones, use the symmetry tool in world coordinates and later use the bone tools to reset the stretch and scale. Remember to unlink the symmetry bones afterwards so they don't follow the right side (**Fig.53**).

7) Create an IMR Point selecting Alien_L_leg_Calf_twist03_SK__BH and align the position to Alien_L_Leg_FK_Foot__SA and link to it. Name the point Alien_L_leg_Calf_twist_Target__BH.

8) Add a *LookAt* constrain to Alien_L_leg_Calf_twist03_SK__BH, the target is Alien_L_leg_Calf_twist_Target__BH and the upnode Alien_L_leg_Calf_twist_Target__BH, and Y on the alignment.

9) Add an orientation constrain to Alien_L_leg_Calf_twist02_SK__BH, the targets are Alien_L_leg_Calf_twist01_SK__BH and Alien_L_leg_Calf_twist03_SK__BH.

10) The twist setup for the calf is setup, so now you can rotate the foot to see how it reacts.

Open Maxfile: 4.3_Alien_deformationRig_03.max to be in this stage.

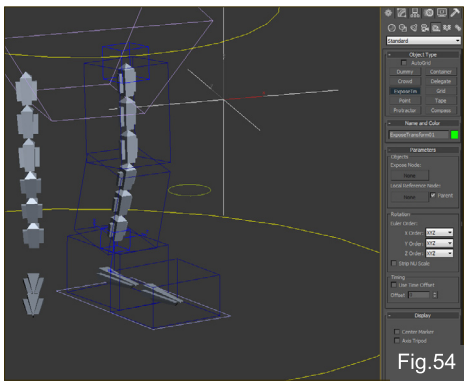
Fig.54

Now we have to create the twist system for the thigh

11) Create a helper - Expose Transform. Expose transforms are quite useful, they help to get the rotations of objects in Euler value and are great to get the value of Alien_L_leg_FK_Thigh__SA when is animated or when is following the IK (**Fig.54**).

Align the parent to Alien_L_leg_Parent__DH and move it to the side, the expose transform will be named Alien_L_leg_Thigh_ET__BH.

12) Choose _L_leg_FK_Thigh__SA as an expose node Alien and the local Euler angles give us the information we want (**Fig.55**).

13) We want to copy the values of Y and Z to the twist bone but not the X value. To be able to paste the values properly we need to

link Alien_L_leg_Thigh_twist01_SK__BH to Alien_L_leg_Parent__DH. The reason for this is that if both objects don't have the same parent, the result will be different when we connect the Y and Z.

14) Connect by wiring the Local Euler Y of Alien_L_leg_Thigh_ET__BH to the rotation Y of Alien_L_leg_Thigh_twist01_SK__BH (**Fig.56**).

15) Connect it by wiring the Local Euler Z of Alien_L_leg_Thigh_ET__BH to the rotation Z of Alien_L_leg_Thigh_twist01_SK__BH.

16) Add an orientation constrain to Alien_L_leg_Thigh_twist02_SK__BH, the targets will be Alien_L_leg_ Thigh _twist02_SK__BH and Alien_L_leg_ Thigh _twist03_SK__BH.

17) The twist setup for the thigh is now set up, so you can rotate the foot to see how it reacts.

Open Maxfile: 4.3_Alien_deformationRig_04.max to be in this stage.

18) Create a blend with IMR create Blend by select Alien_L_leg_Parent__DH, and Alien_L_leg_FK_Thigh__SA and name the blend point as Alien_L_leg_Hips_blend_SK__DH.

19) Create a blend with IMR Create Blend selecting Alien_L_leg_FK_Thigh__SA and Alien_L_leg_FK_Calf__SA and name the blend point as Alien_L_leg_Knee_blend_SK__DH.

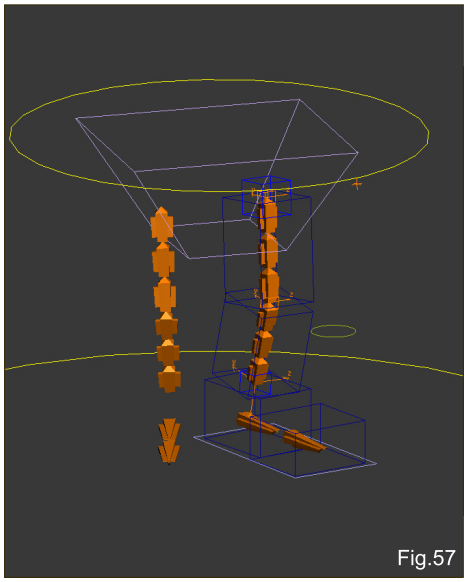
Fig.57

20) Now we have almost finished. Something I normally do is to set the wire color of the deformation rig in orange. To do so I will select all the objects in the layer 0 and run the maxscript $.wirecolor = orange (**Fig.57**).

Open Maxfile: 4.3_Alien_deformationRig_05.max to be in this stage.

4.2 Create the Other Side

Now repeat the same process of 4.1 with the right side. If you have mirrored the bones you will save a lot of work (**Fig.58**).

Open Maxfile: 4.3_Alien_deformationRig_06.max to be in this stage.

4.3 Checklist for Leg Deformation Rig

Before we move on to another part of the rig is good to do a checklist for rigging. There are always too many things to remember to check. Using this checklist will make things easier.

1) Proper names
2) Proper names for the layers
3) Objects in their correct layers
4) No object in layer 0
5) No duplicates names
6) Check all the meshes follow correctly
7) Controls have correct rotation orders
8) Limited keyability in controls and proper locks

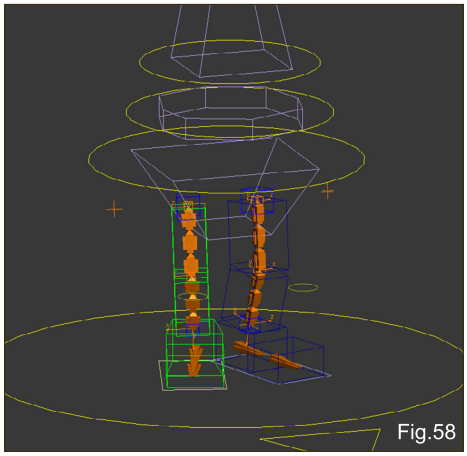
Fig.58

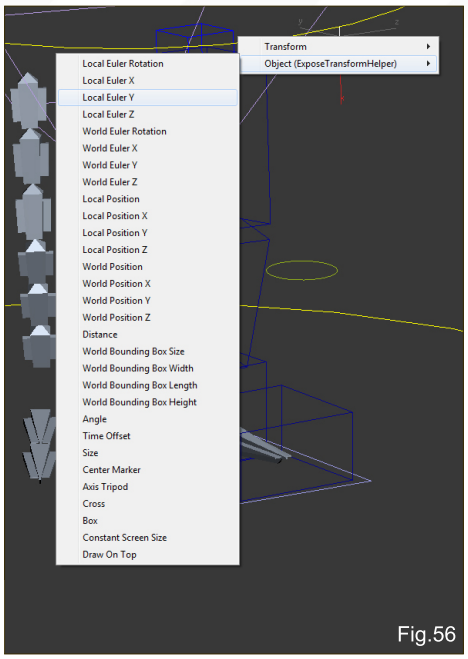

Fig.56

9) Rotate and move the rig with autokey to check all is ok
10) Delete keys and leave a clean version for animators
11) IMR keytools zero all works properly

Open Maxfile: 4.3_Alien_deformationRig_07.max to be in this stage.

4.4 Skin

When we skin the legs, we will follow the same notes that we already used in the previous chapter.

Note: To see the weight of skin modifier better go to the Command Panel display and set the mode to Shaded In Object Color and the color for the mainbody Alien_C_body__MF to gray.

Note: To avoid having the envelopes confusing the screen, we can use the option inside the skin modifier on the category Display > Show no envelopes.

Note: Once all the objects for the skin are added, we don't need to have the layer Hidden visible, so we can hide it and focus on the weighting, so we don't see objects that we don't need in the viewport.

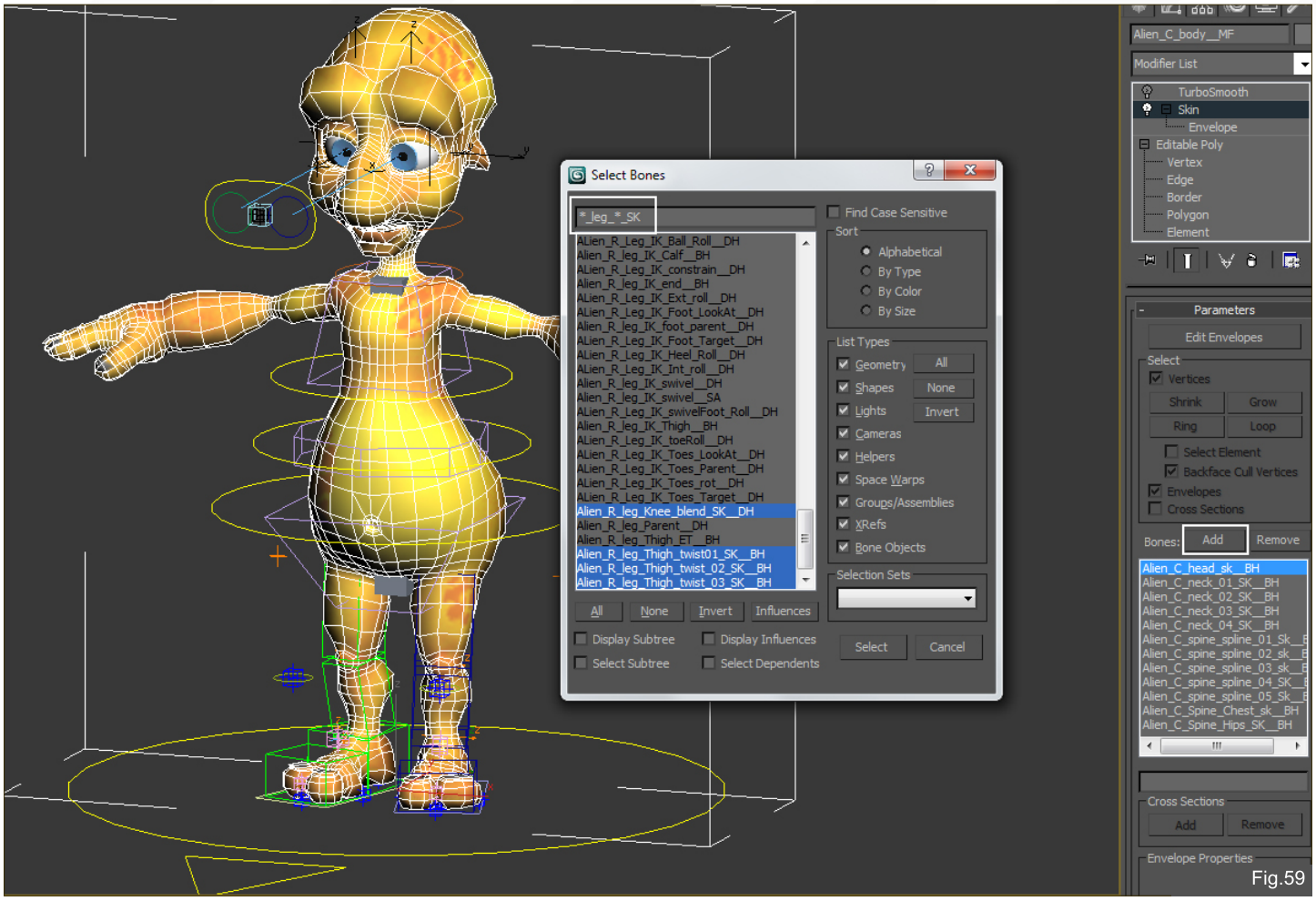

Fig.59

We will start adding new objects to the skin modifier. Make sure the layer Alien_Hidden is not hidden. Use the "_Leg_*_sk*" to add the object for skin (**Fig.59**).

We don't need to edit the skin properly for both legs, we can use the options for mirror weight so once we have one side weighed properly we will mirror the other side.

We hide the faces on the right side to focus in the left side only (**Fig.60**).

For a quick start, I recommend weighting each area that you think will follow a bone at 100; when two bone areas meet another bone, weight 50 to one bone and 50 to the other (**Fig.61**).

After we have our base skin, create poses for testing the skin. Use the rig in FK mode as it

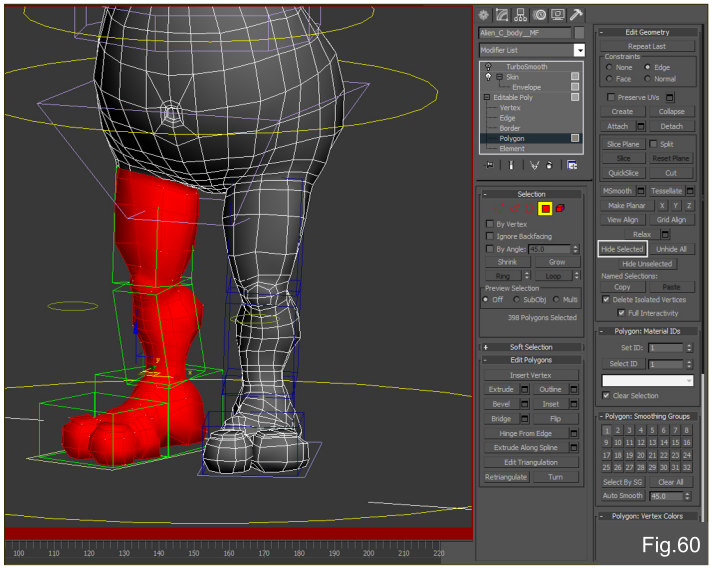
Fig.60

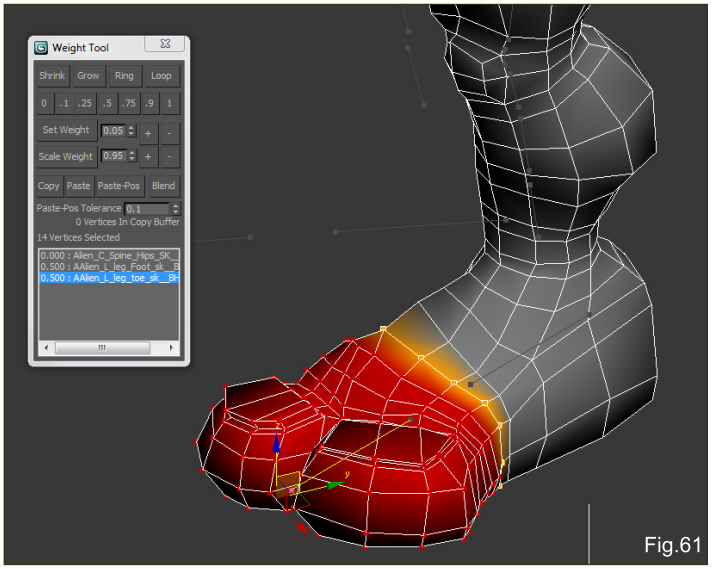

Fig.61

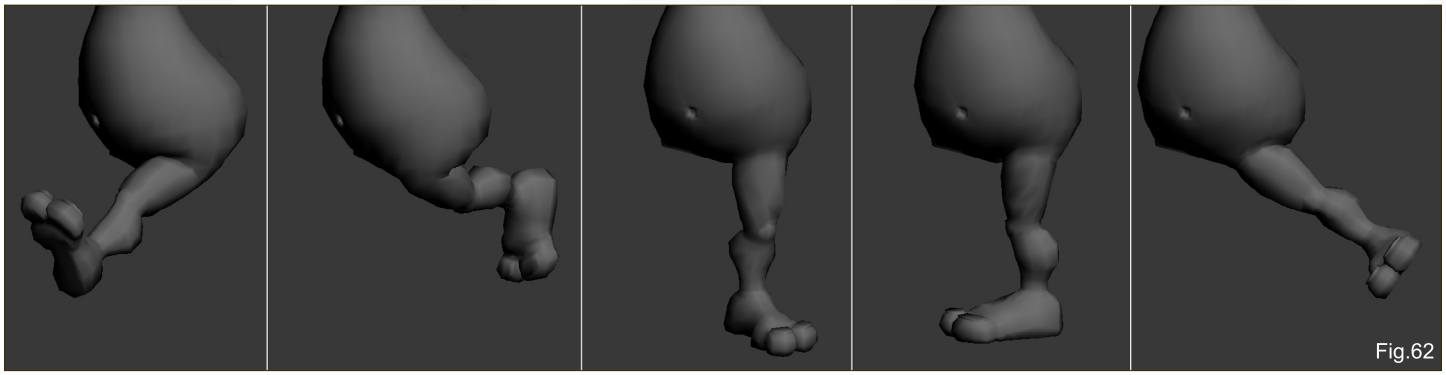
Fig.62

is easier to pose. Create poses for each FK control to see how the skin reacts. Each pose is 10 frames after the previous pose. We test only one control at a time, so we can locate the deformation.

I prefer this system, so we don't forget to skin for any possibility. Having a few controls moved at a time can make tweaking the skin confusing.

Note: A good practice is to key all the controls in each pose to avoid strange in-between poses.

We can do normal procedures or we can select all the controls in the desired frame and using IMR key tool with the option KeyAll put a key in each control object in each controller.

- Thigh (**Fig.62**)
- Calf (**Fig.63**)
- Foot (**Fig.64**)
- Toes (**Fig.65**)

Once we have created the poses, tweak the skin. The two blend objects we created for


Fig.63

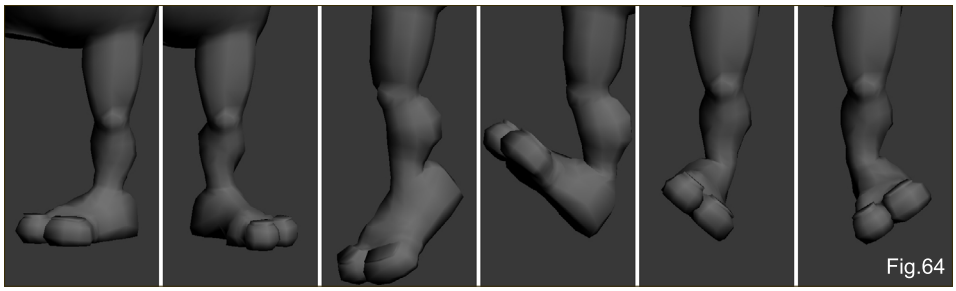
Fig.64

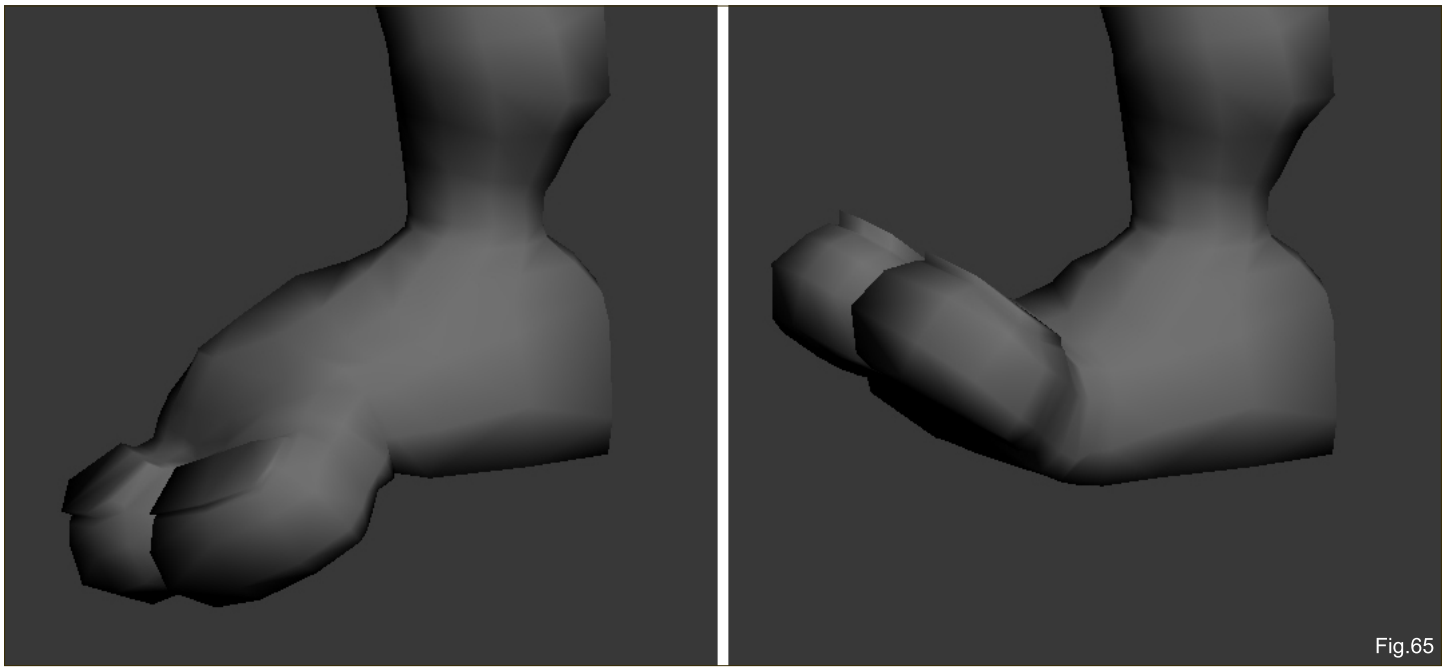
Fig.65

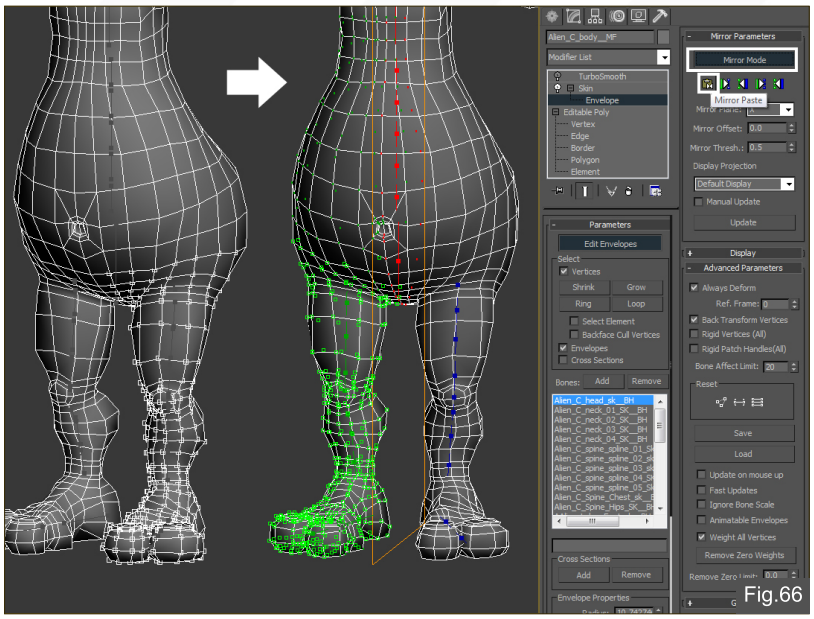
Fig.66

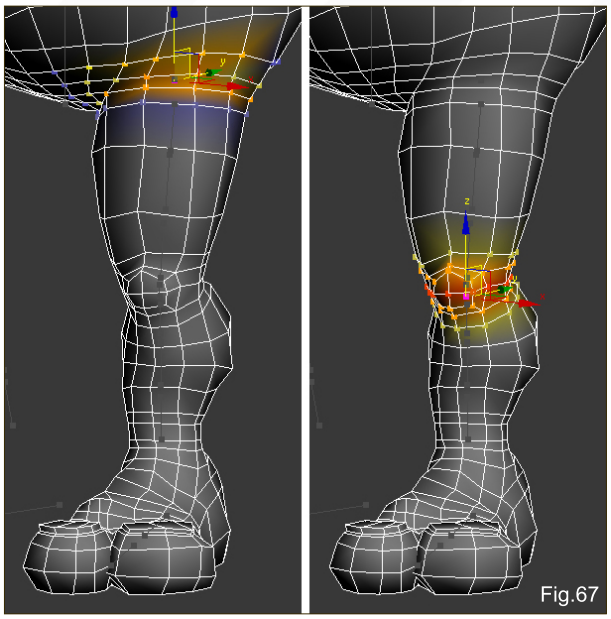
Fig.67

helping for deformation Alien_L_leg_Hips_blend_SK__DH and Alien_L_leg_Knee_blend_SK__DH require special attention -with them we will achieve a much better deformation in the areas of knee and hips (**Fig.66**).

Now that we are happy with the left leg, unhide the polygons to be able to see the right leg. Select all the vertexes for the left leg. In the modifier skin in the mirror option, use the button Mirror Paste to paste a symmetric weight to the other leg. The symmetric tool will save you lot of time (**Fig.67**).

Open Maxfile: 4.4_alien_leg_deformation.max.

4.5 Final Tweaks

Now that we have skinned the legs, we can put back the shaded mode in material colour. Finally add a Turbosmooth modifier on top of the skin to see how the mesh will look subdivided. Move the time bar to see the final result with the mesh subdivided.

Open Maxfile: 4.5_Alien_leg_final.max to be in this stage.

We must leave a clean file to continue in the next chapter. To do so we have to erase the animation of the controls; we can do this with Max normal procedures, or we can select all the controls at frame 0 and using IMR key tool erase the keys with the option Clear All.

Now we got a big part of the character rig and we can start to test poses with it (**Fig.68**).

Luis San Juan Pallares

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Or contact:

luis@luis-sanjuan.com

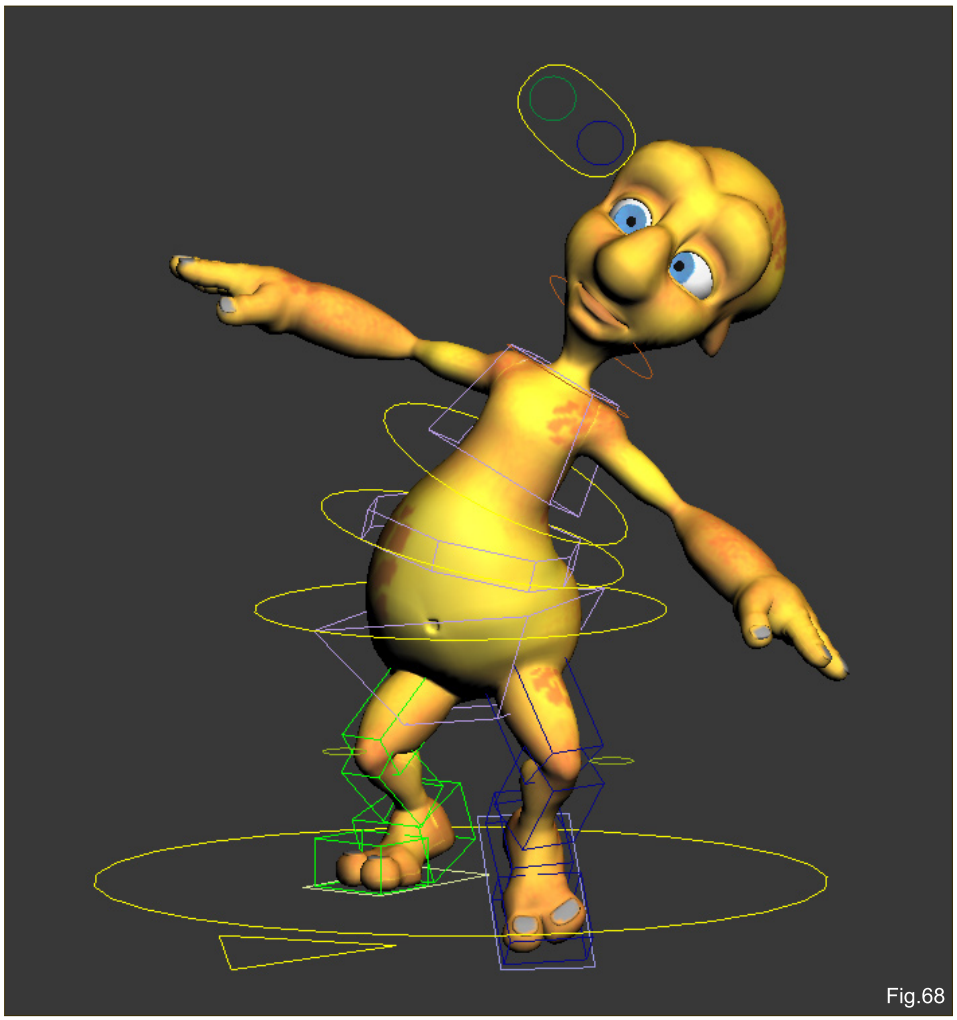
Fig.68

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Rig Creation – Part 1

Chapter 4 | This Issue
Rig Creation – Part 2

Chapter 5 | Next Issue
Facial Rigging

Chapter 6 | September Issue 061
Scripting

INTRODUCTION TO RIGGING

The aim of these tutorials is to show and explain how you might tackle rigging your 3D character for animation. These tutorials will give help and advice to novices and experts who are looking to build on their rigging skills or approach rigging for the first time. The series gives a detailed step by step guide as to how to approach rigging but also shows us how to tackle common problems and issues that regularly occur even in a professional environment. The artists will be reflecting on working in the industry as well as talking us through their individual approaches to creating the best rigs possible.

DOWNLOAD RESOURCES

- Free Models
  This download includes the models used within this tutorial

Introduction to Rigging: 4 - Rig Creation - Part 2

Software used: Maya

Chapter Overview

In this chapter we will build the rig setups using the joints we created in our last lesson and add control curves for the animators to use (after all, no one likes to have to select the actual joints when animating - sometimes this will not even work and break the rig).

Controls

Now it's time to set up controls to move the skeleton. We usually create CV curves as controls and modify the shapes by editing components to make them more intuitive for the animators (**Fig.01**).

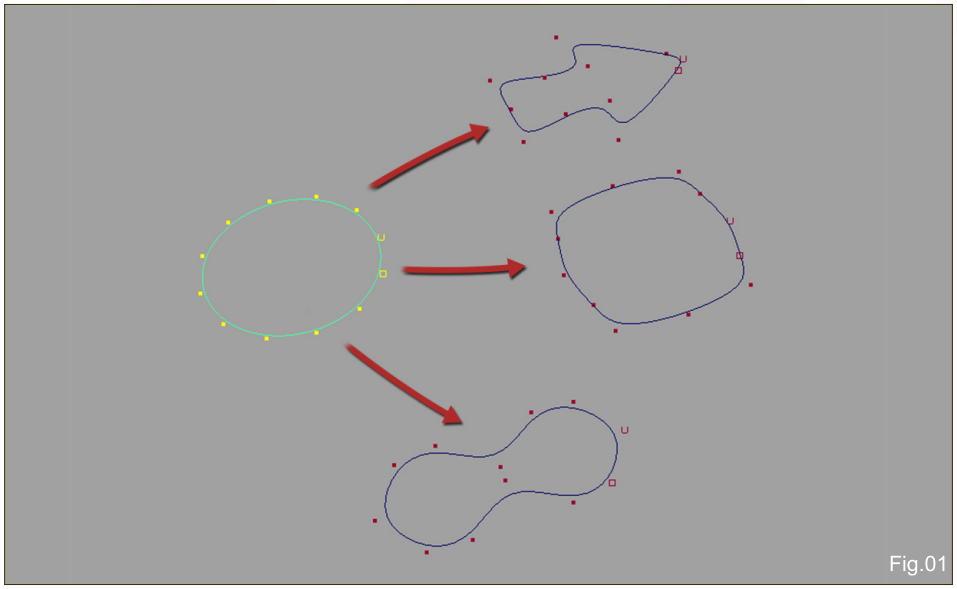
Fig.01

We should also add attributes to them in the ChannelBox panel (ChannelBox > Edit > Add Attribute) to get powerful results as we will see next (**Fig.02**).

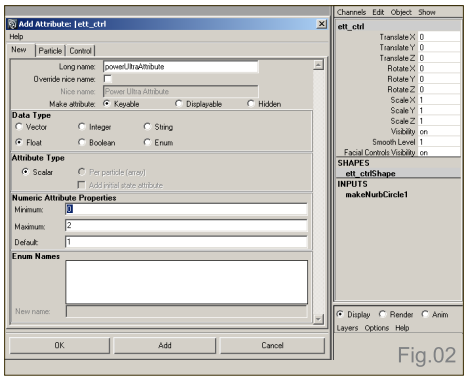
Fig.02

zeroOut

When creating our controls we must make them clean and simple, which means all controls by default cannot have any transform value. We can nullify these values by freezing the transformations (Any Mode > Modify > Freeze Transformations). But notice that when you freeze a control curve, it's orientations will jump back to the world's axis. That's a problem. Most of the time we don't want to lose the control's orientation. That's where we use the zeroOut process.

To zeroOut an object you just have to:

- Create an empty group.
- Translate and rotate the group to the same position and rotation of your object (you can do this by creating a parentConstraint to snap the group to the object and then delete the constraint).
- When they are both on top of each other, parent the object to the group.
- Voilá, your object now has zero values without freezing and without losing its orientation.

TIP (zeroOut): Notice this is not the same as freezing the transform (that aligns the object to the world). Keep the zeroOut process in mind, as it is the key to easily creating correctly oriented controls and we will be using it a lot in this chapter.

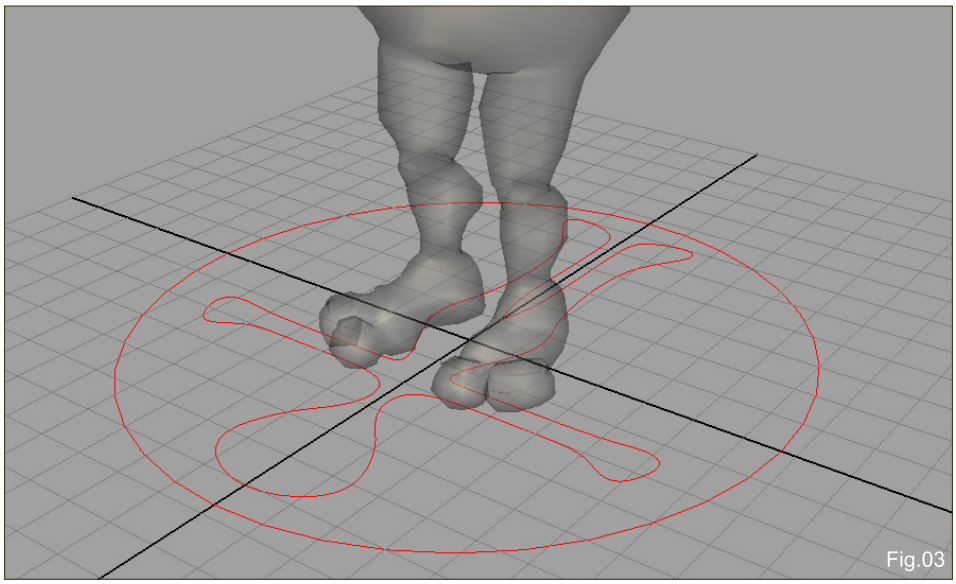
Fig.03

Master Control

This will be our global control for the character rig. You can use the default circle or create a CV curve shaped like a character, it is up to you. Name this curve "Master_ctrl" and add one attribute named "EXTRAS" as the only displayable label for our attributes. All the curve controls we will be creating must be in a group inside of the "Master_ctrl" so the entire rig will behave properly (**Fig.03**).

The Spine Rig

To create the spine rig we will build curve controllers for each joint to be driven with parentConstraints. Starting from the "root_jnt" up to the "spineC_jnt", name them as "hips_ctrl", "spineA_ctrl", "spineB_ctrl" and "spineC_ctrl" and align them to the joints and zeroOut.

Now parent the spine curves so they form a hierarchy (spineA > spineB > spineC) and finish by parenting the "spineA_ctrl" and the "hips_ctrl" under another curve called "cog_ctrl". This will be our Center Of Gravity control, so we can move the entire spine using only one curve (**Fig.04**).

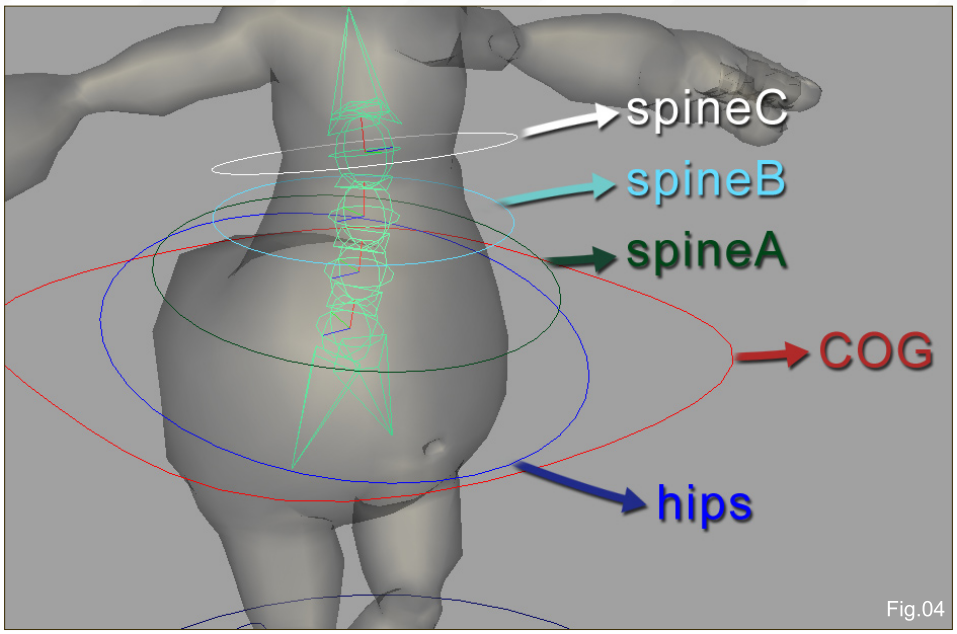

Fig.04

To finish, create a group with these curves named "controls_grp" and parent it to the "Master_ctrl".

Neck, Head and Jaw

Now let's create curves to control the neck, head, jaw and chin. To make it easier for the animators to see and select the controls, edit the components (control vertices) of the curves. We usually start with circles and first align them to their respective joints before remodeling to the desired shape. When you are done shaping, zeroOut each one of the curves, create parentConstraints to make the curves drive their respective joints and then put them in a hierarchy by parenting the chin's zeroOut group to the jaw curve, the jaw's zeroOut group to the head curve, the head's zeroOut group to the neck curve and finally the neck's zeroOut group to the "spineC_ctrl" created earlier (**Fig.05**).

IK/FK Blend Limbs

Sometimes animators need to use Forward Kinematics (FK) and Inverse Kinematics (IK) in the same scene. Luckily, we can blend these two techniques in our rig - bringing lots of advantages. At the first contact it can be a little complex, but do not worry, it gets easy when we understand the simple idea behind the concepts. We will only explain how to set up a blend for the arms, but the same technique can also be used for the legs.

Start by duplicating the shoulder joint and renaming its "_jnt" suffix to "_fk". Do the same for all its children joints. Repeat the process but now rename the suffixes as "_ik". Delete the forearm and finger joints from the newly created "_ik" and "_fk" hierarchies. (You should end up with a four joint chain, starting on the shoulder and ending on the wrist)

NOTE: The joints are separated for your better understanding - the chains must be exactly on top of each other.

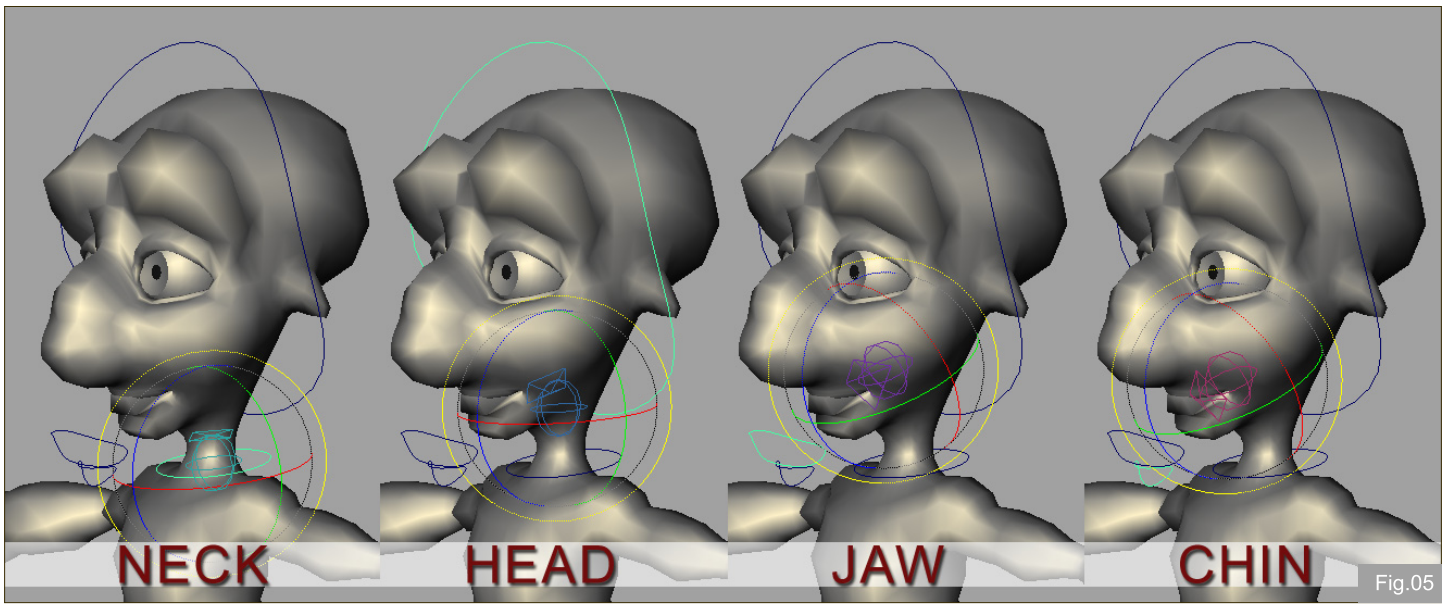

Fig.05

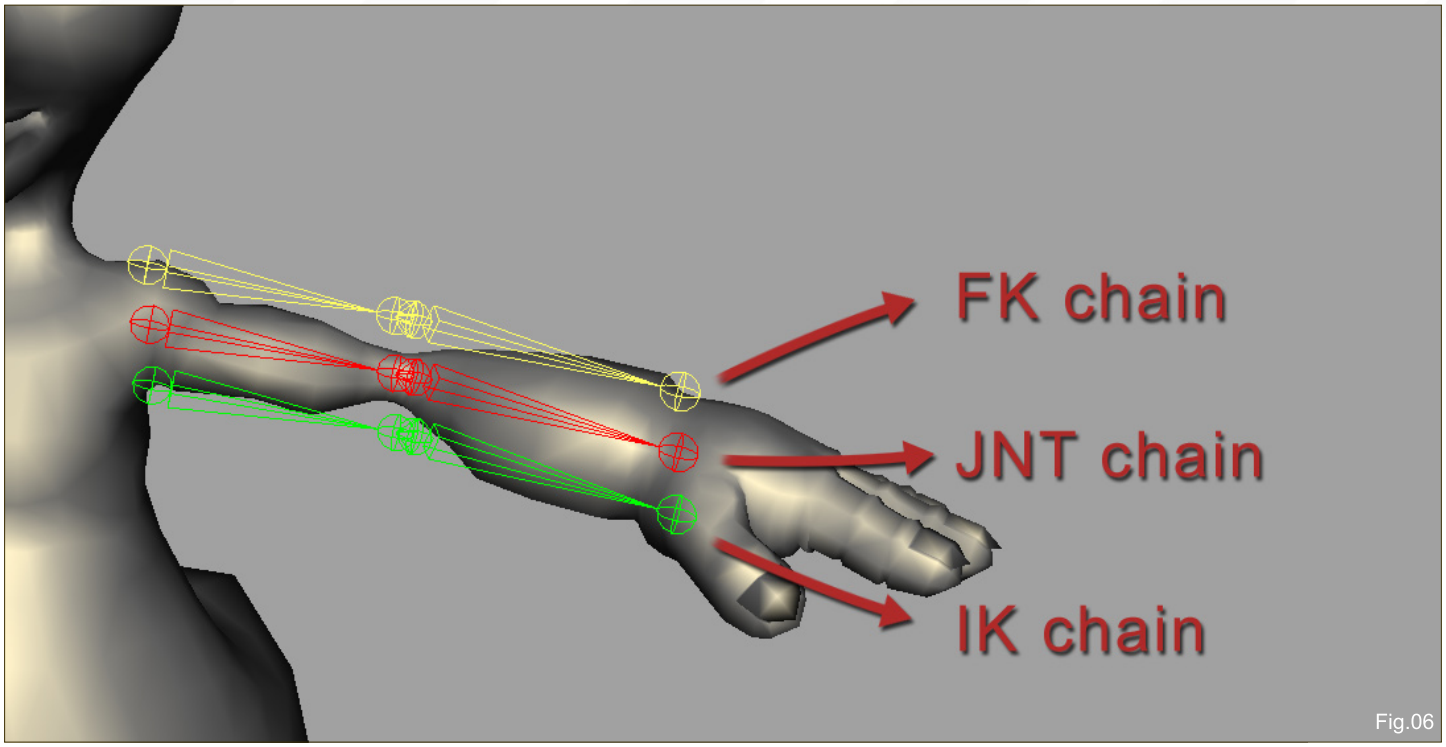

Fig.06

TIP (duplicate_IK/FK): Renaming is simple using the Search and Replace Names command… (Any Mode > Modify > Search and Replace Names...). Try to use it (**Fig.06**)!

Now let's constrain all the joints on these three hierarchies. Follow these steps for each joint of the chain we want to blend:

- First select a "_fk" joint.
- Add its corresponding "_ik" joint to the selection.
- Finish by adding the corresponding "_jnt" joint and applying an orientConstraint (Animation > Constrain > Orient).

Remember to do this only once for each joint in the "_jnt" chain; this will make our "_jnt" chain follow both the "_ik" and the "_fk" chains though the orientConstraint. If you move the joints around you will see that they follow both chains equally. We will now create an attribute to control these influences.

For all limbs we will add a float attribute called "(limb)_ikFkBlend" (for example: "l_arm_ ikFkBlend" for the left arm), with min value 0 and max value 1 to the "Master_ctrl" curve. Connect this attribute on every (FK-W0) of the orientConstraints we just created (the constraint nodes should be right under the "_jnt" joints).

Go to the Hypergraph panel (Any Mode > Window > Hypergraph), create a reverseNode (in Hypergraph > Rendering > Create Render Node… > Utilities tab > Reverse) and connect the blend attribute from the "Master_ctrl" curve on its inputX. Now, connect the outputX attribute of the reverseNode on all of the (IK-W1) of the orientConstraints. Look at the image sequence for a better comprehension (**Fig.07**).

TIP (direct connections): Directly connecting attributes can be a cleaner alternative to driven keys or expressions, as they evaluate real-time and do not create animation curves.

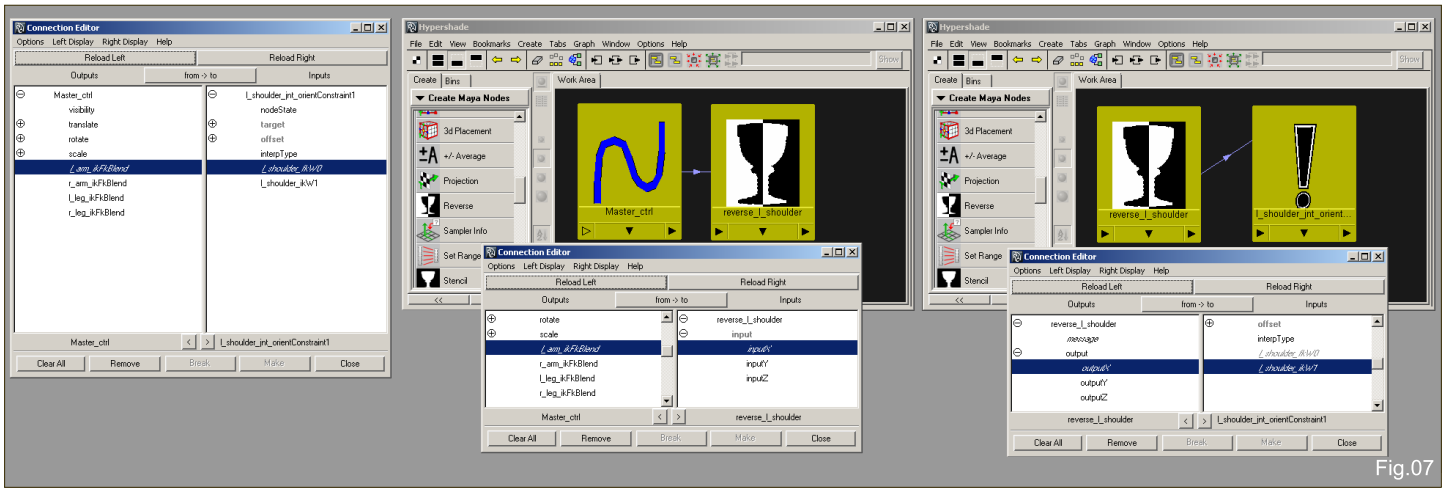

Fig.07

Do the same for the leg joints too, but do not do anything with the feet joints as we will take care of them further on.

IK HANDLES CREATION

This is an important step. If you skip this, your IK chains will be useless! Now that we have created the chains we can create our ikHandles (Animation > Skeleton > IK Handle Tool) to get the inverse kinematics behaviour from our joints.

- For the arms, create a rotate plane (ikRPsolver as the current solver) for both sides starting in the "l_shoulder_ik" joint and ending on the "l_wrist_ik" joint.
- For the legs, create the rotate plane ikHandles starting in the "l_leg_ik" joint and ending on the "l_ankle_ik" joint.
- For the feet, create two single chain solvers (ikSCsolver). One starting in the "l_ankle_jnt" and ending on the "l_foot_jnt" and the other one starting at the "l_foot_jnt" and ending at the "l_foot_end". Name them as "l_foot_ikh" and "l_toe_ikh".
- Do this on the left and right sides of the limbs and feet.
- Group all the ikHandles in a single group named "ikHandles_grp".

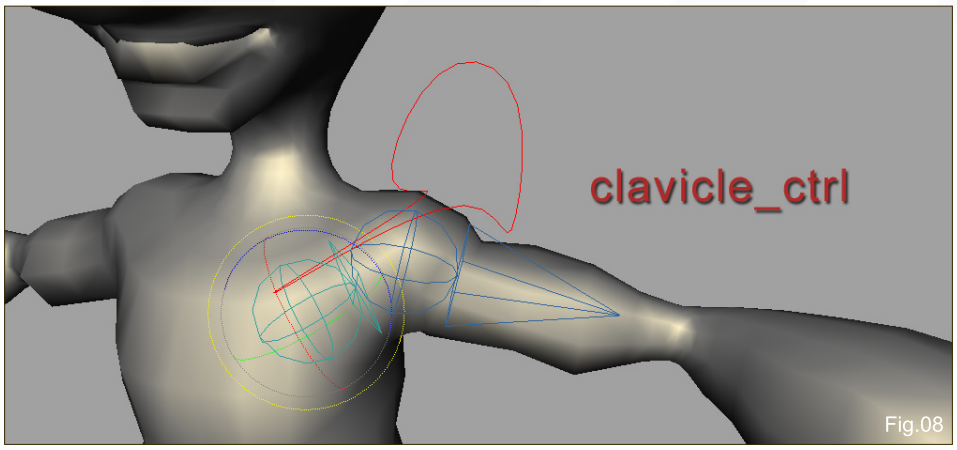

Fig.08

CLAVICLE CONTROL

Since the clavicle doesn't need to have an Ik to Fk blending, just create a simple curve oriented like the joint, zeroOut and parentConstraint the "clavicle_jnt" to your control on both sides like so (**Fig.08**). To finish, just parent the zeroOut groups of both clavicles to the "spineC_ctrl".

ARMS CONTROLS

To drive these two newly created chains, create controls as you wish - use the same process as the head/neck controls using zeroOuts to pseudo-freeze your controls. For the FK chain, create a control for each joint (except for the elbow, that will have only one control as we skip the second joint), parented hierarchically and driving the correspondent joint with a parentConstraint. There will be three controls (shoulder, elbow and wrist) that must be parented to the clavicle controller.

As for the IK chain, create only a control for the wrist (aligned and oriented to the wrist joint) that will orientConstraint it; also pointContraint the corresponding ikHandle of the limb to the controller. ZeroOut the curve and parent it to the "controls_grp" (**Fig.09**).

TIP (ik/FK_visibility): You can set drivenKeys on joints and control visibilities when switching between IK and FK mode.

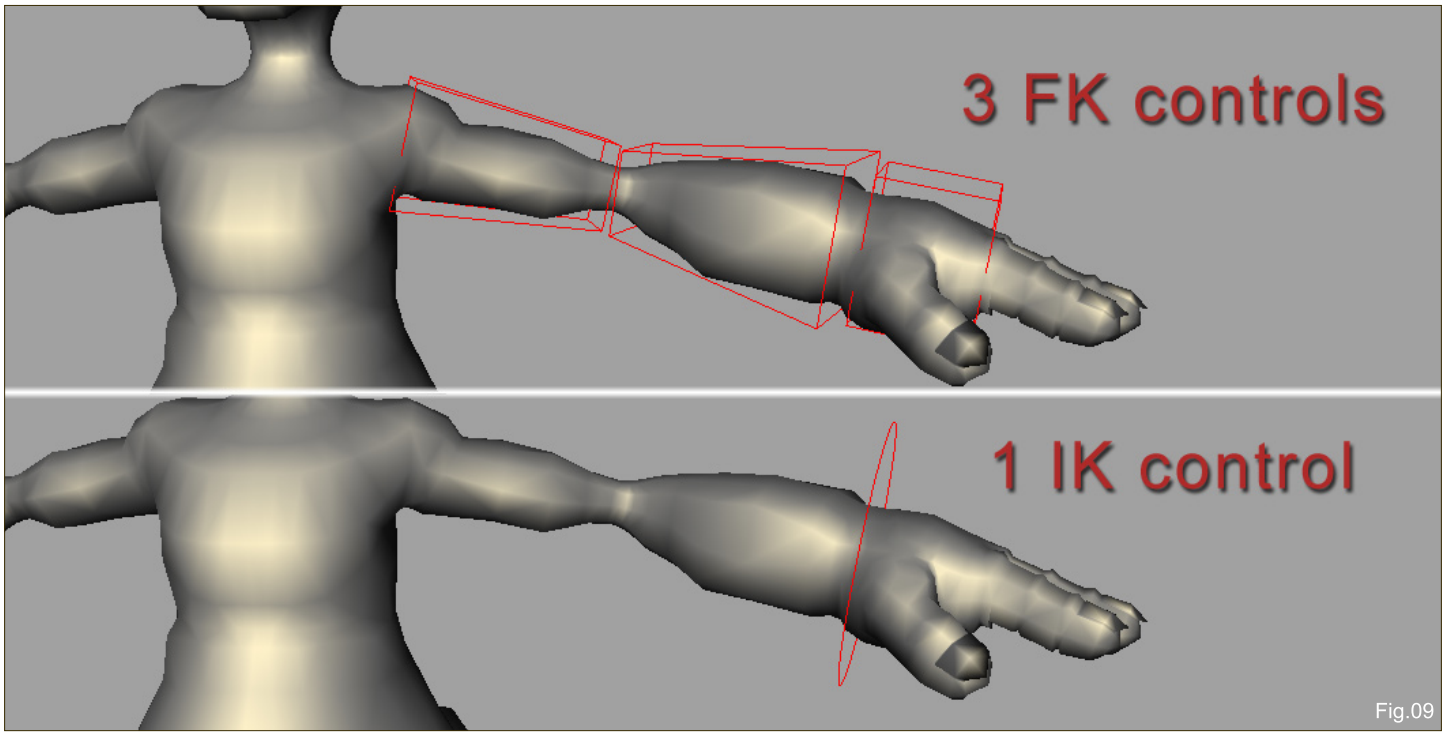

Fig.09

FOREARM TWIST

To simulate our radius and ulna bones in the arms, we will use the "l_forearm_jnt". Start by creating a curve to control the forearm twisting named as "l_forearmTwist_ctrl" and position it on top of the "l_forearm_jnt". ParentConstraint the control to the lowElbow joint and lock and hide all of its attributes (ChannelBox > Channels > Lock and Hide Selected). We won't be animating it's position; to keep our rig organized, put this control on the "controls_grp".

Ok, now let's do an expression to connect the forearm control's rotation X to drive the rotation X of the wrist joint. Add an attribute to the forearm control curve named "autoRotateIntensity" as float with min value 0, max value 1 and default value 0.5. Do this for the right arm joint too.

Now, go to the Channel Box menu Edit and choose Expression. Another way to do this is by going to (Any Mode > Window > General Editor > Expression Editor). In this panel, write the expression below:

*l_forearm_jnt.rotateX = l_wrist_jnt.rotateX * l_forearmTwist_ctrl.autoRotateIntensity;*
*r_forearm_jnt.rotateX = r_wrist_jnt.rotateX * r_forearmTwist_ctrl.autoRotateIntensity;*
(**Fig.10**).

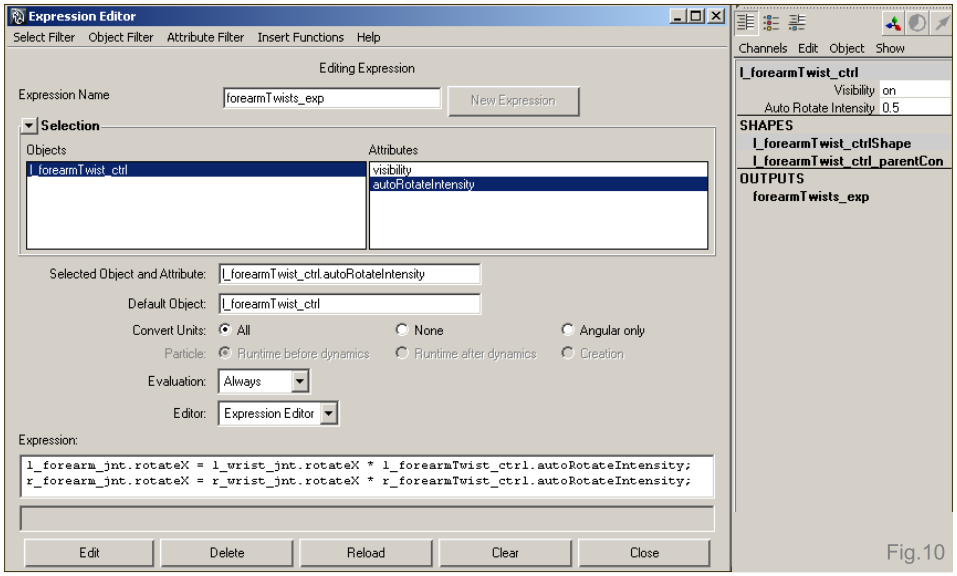

Fig.10

TIP (forearm_expression): Notice we are creating only one expression to control both forearm twists, so create the other side control before applying the expression to avoid errors!

FINGERS

The simplest way to rig fingers is to create a curve for each one of the joints. Align and orient, zeroOut them in a hierarchy (like the spine controls) and then parentConstraint the joint to the corresponding curve.

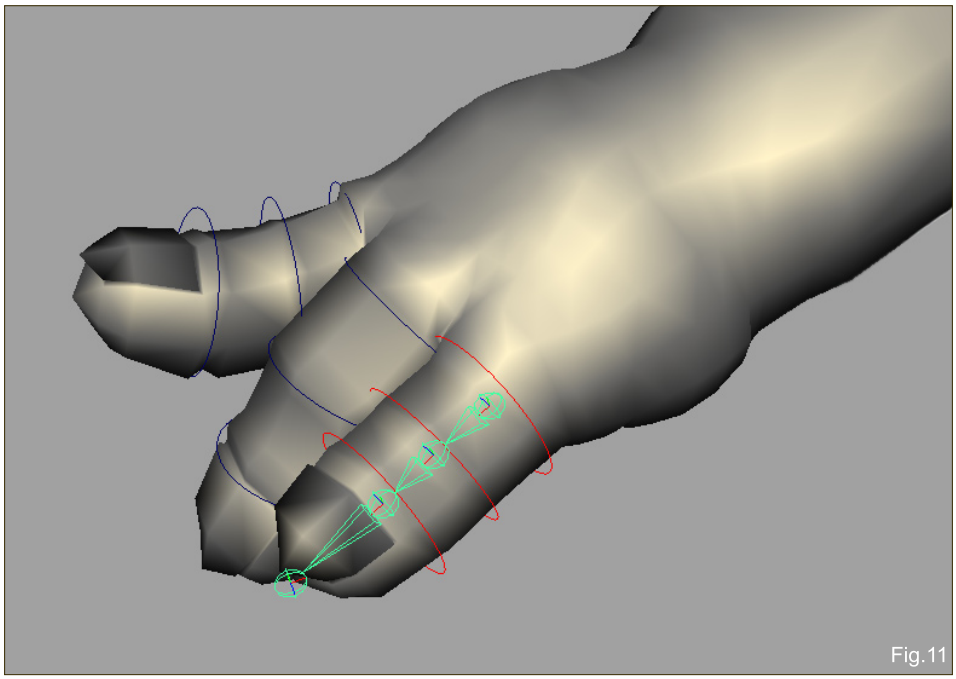
Fig.11

If we need to control multiple fingers at the same time, we can create more groups above them and set driven keys.

For each finger you should:

- Create a curve and snap its position and rotation as the same as the finger joint.
- ZeroOut the curve to nullify transform values while still maintaining its orientated as the joint.
- Now just constrain the respective joint to its curve and parent the base curves (that control the first joint of the finger) to the "controls_grp";

To make the finger curves follow the rig, when you have created the controls for one hand, group all of them and parentConstraint to the "wrist_jnt" so it is always following the hand, no matter the IK/FK blending (**Fig.11**).

TIP (rig_Fingers): This process is easier to do using a MELscript, which we will cover in Chapter 6 of this tutorial.

LEGS CONTROLS

Ok, now that the arms are complete, let's quickly create the legs controls. It's the same process except for the IK control - you might want to orient it to the world (with just a little bit offset on the Y axis to follow the foot angle) so that the translate Y of the controller is facing upwards. (**Fig.12**)

The FK controls go parented in the “hips_ctrl” and the IK controls in the “controls_grp”. Also do not forget to pointConstraint the leg’s ikHandles to the IK controllers, but do not create the orientConstraint to the ankle joint because the foot does not work like the hand.

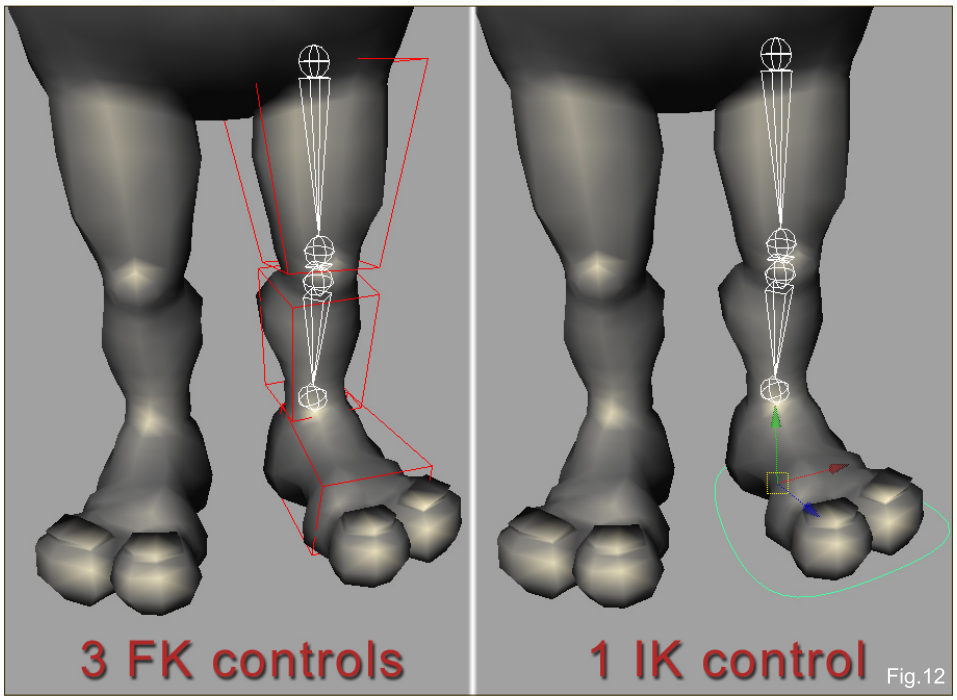

Fig.12

Reverse Foot

Sometimes we must think beyond the real anatomy because movements in real world are very complex and difficult to reproduce in 3D. That is why we must fake some processes: let’s take a look at the “Reverse Foot” setup that is used to get good foot control.

Create a hierarchy of four joints, then rename and dispose them on top of the original foot chain, as in **Fig.13** (start by the Base joint and end with the Ankle joint).

The idea is to create an inverted chain that will drive the bones in the reverse order. To make our foot joints follow this new chain; just pointConstraint the “l_foot_ikh” we created earlier to the “l_footReverseHeel_jxt”.

Before going on, let’s create a control to move the toe independently, only one curve for both IK/FK modes named “l_toe_ctrl”. Create and align it to the toe joint then zeroOut. Parent the group to the “controls_grp” and parentConstraint it to the “l_footReverseTip_jxt” so it is always following the foot. ParentConstraint the “l_toe_ikh” to this control and now both our feet ikHandles are being controled.

Group the reverse joints we just created as “l_footReverse_grp” - this will act as our ‘hand’. ParentConstraint it to both the FK and IK foot controls, do not forget to also make the blending connections to switch who is driving the group accordingly. While you’re at it, notice that the foot FK motion is still not completely right. To fix it, just follow these two steps for both feet:

- Connect the reversed blending attribute (“reverse_l_leg.outputX”) to the feet ikHandles’ ikBlend attributes (“l_foot_ikh.ikBlend” only!

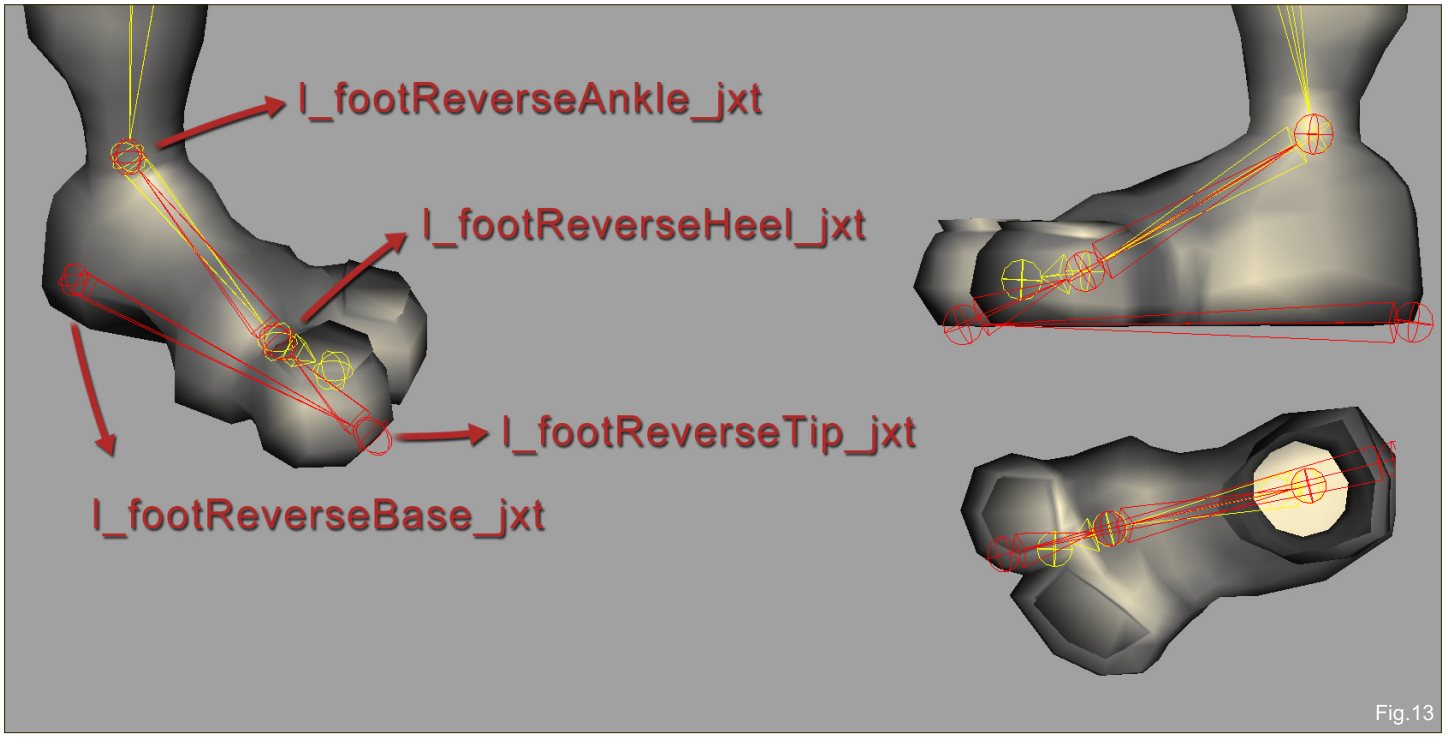

Fig.13

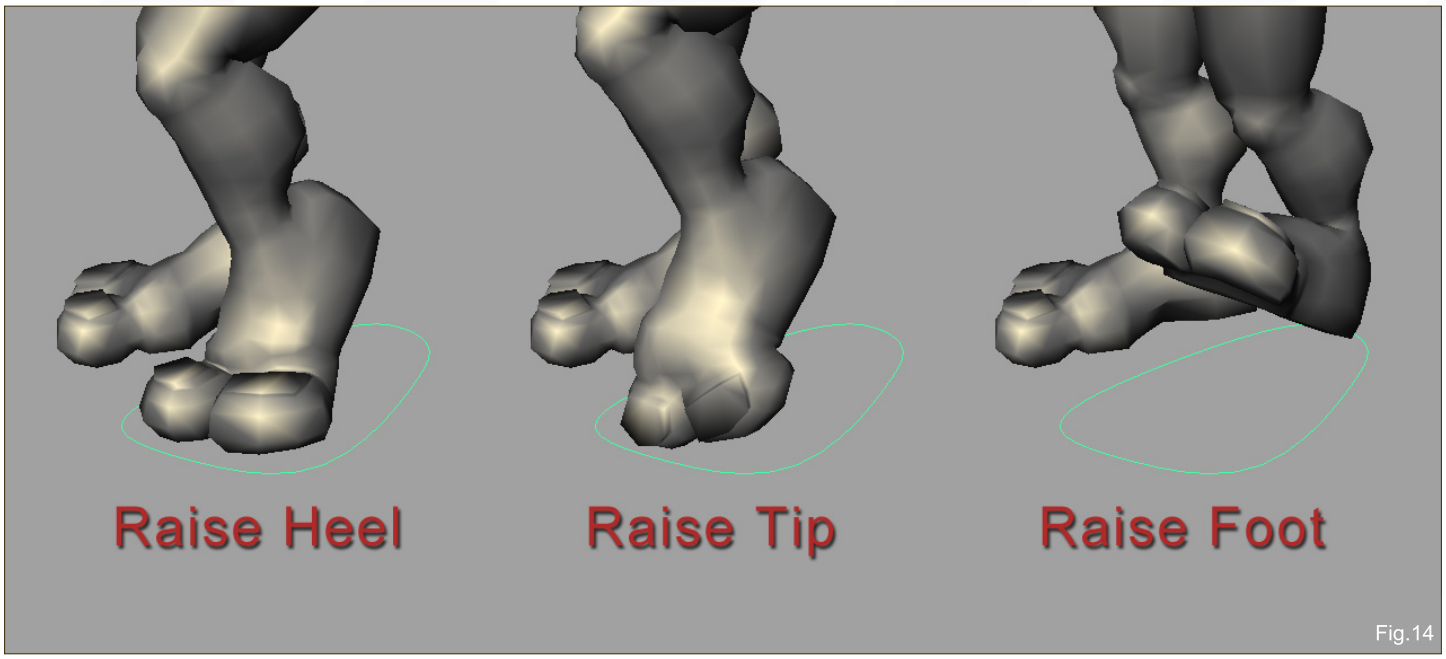

Fig.14

Leave “l_toe_ikh.ikBlend” always as 1).
- Now remember the “ikHandles_grp”? Group the scattered “l_foot_ikh”, “l_toe_ikh” and “l_leg_ikh” ikHandles into a group called “l_foot_ikh_grp” and parentConstraint it to follow its corresponding reverse foot group - in this case, “l_footReverse_grp”.

If you followed these steps correctly, when you rotate the reversed chain, the heel now raises without losing ground contact!

Reverse Foot Attributes

Let’s add float attributes without min and max values to the foot IK controller, which will drive the rotation of the respective reverse foot joints for the animators to use. Let’s name them: “Raise Tip”, “Swivel Tip”, “Raise Heel”, “Swivel Heel”, “Raise Foot” and “Swivel Foot”.

The connections are always the same. Connect the attribute to the corresponding joint using the Connection Editor panel (Any Mode > Window > General Editors > Connection Editor). For example (**Fig.14**):

- Raise Tip > footReverseTip_jxt.rotateZ
- Swivel Tip > footReverseTip_jxt.rotateY
- Raise Heel > footReverseHeel_jxt.rotateZ
- Swivel Heel > footReverseHeel_jxt.rotateY

IK Twisting Controls

Now that we have created all of our IK controls, let’s add an attribute to control the limbs orientations: the “twist” attribute. This little fellow will play the part of our polevector. As an attribute, there are less controls floating around and since it works in angles, not in translation aiming like the polevector,, it is much more intuitive and clean to animate.

Ok, so create a float attribute on each arm and leg IK control, and make a direct connection to the “twist” attribute of their respective ikHandles. To finish, select those four ikHandles and in the channelBox, set their polevector X, Y and Z values to zero - this will “free” the movement, reducing the flipping effect to almost none.

Wrapping Up

To finish our entire rig, group the “root_jnt”, “l_footReverse_grp” and “r_footReverse_grp” as “joints_grp” and parent this group and the “ikHandles_grp” to the “Master_ctrl”.

You can hide these two groups, leaving only the geometry and the controls visible - and now our setup is also scalable!

You will notice the eyes and teeth are still not following the rig. We will see this is the next lesson! For now, you can group these and parentConstraint to the head joint.

Phew! We have come to the end of this extensive lesson and now you can almost say your character is fully rigged and ready to be animated! Now, how about giving him more emotion through facial expressions? That’s what we are going to study in our next lesson. Until then, practice what you have learned in this lesson - how about trying to come up with a solution for an automatic clavicle setup using Constraints, Expressions and Set Driven Keys!

Richard Kazuo & Danilo Pinheiro

For more from these artists visit:
http://riggerman.animationblogspot.com/
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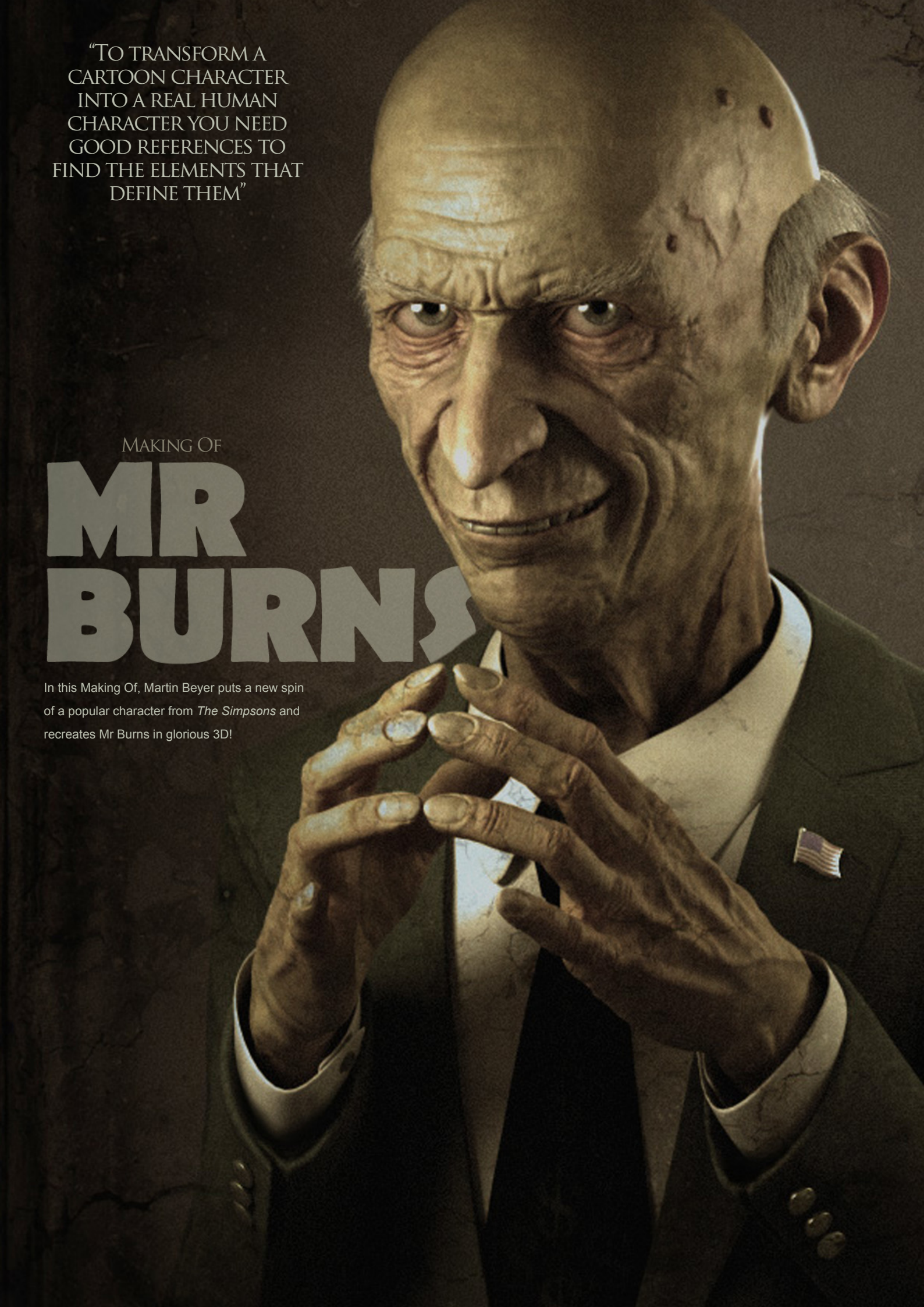

"To transform a cartoon character into a real human character you need good references to find the elements that define them"

Making Of

MR BURNS

In this Making Of, Martin Beyer puts a new spin of a popular character from *The Simpsons* and recreates Mr Burns in glorious 3D!

MR BURNS

Software used: ZBrush

REFERENCES

To transform a cartoon character into a real human character you need good references to find the elements that define them. Most cartoon characters are very simple - especially characters from *The Simpsons* as they don't have much detail at all. I decided to choose a typical pose for Mr. Burns to give the human-looking model his personality. Other important things to consider were the facial expression, smile, teeth, long nose... these were good focal points to concentrate on for the modeling process.

BASE MESH

I started with my standard head base mesh, which I built with ZSpheres in ZBrush (**Fig.01**).

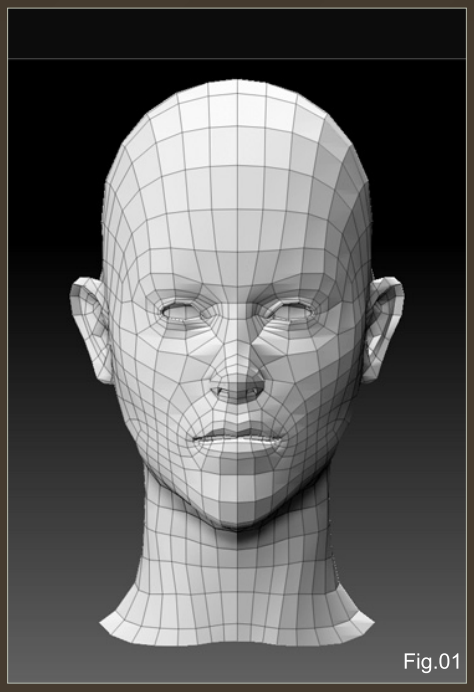

Fig.01

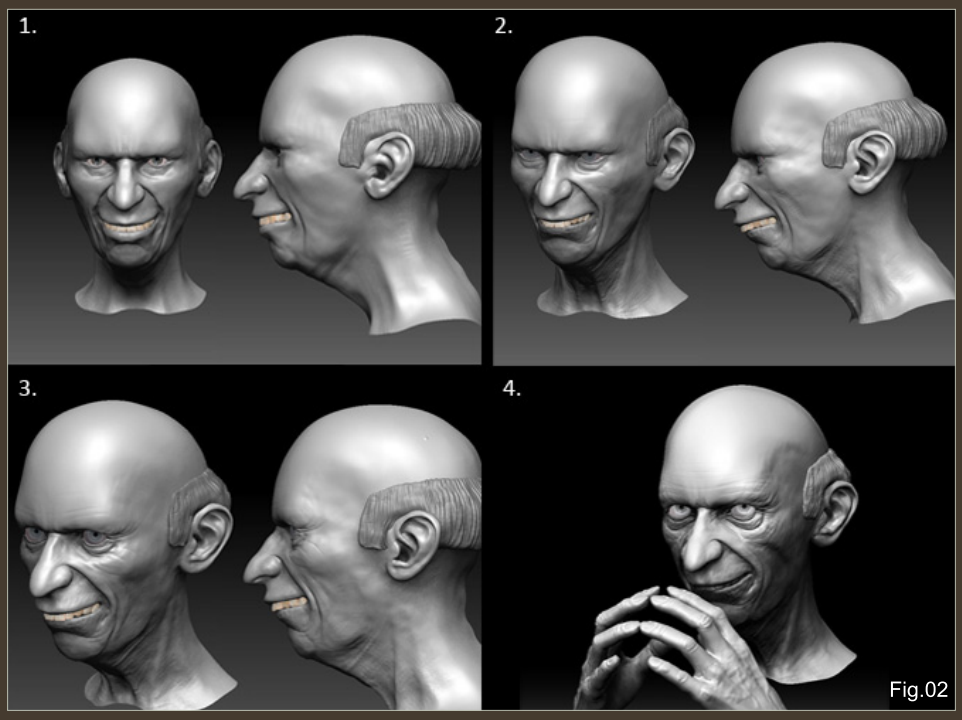

Fig.02

MAKING THE FACE

To model the head and the face of Mr. Burns was a long process. The silhouette of his face was easy to build. I copied the typical shapes of his nose, chin and forehead, but the front view was trickier. After I added some detail to the face I used the Move brush in ZBrush to push around the face proportions until I was satisfied with the result. After that I concentrated on the rest of the fine details, like the folds and wrinkles (**Fig.02**).

The hair was created later with the Hair & Fur mod in 3ds Max. The simple haircut was easy, but I had to convert the hair into geometry to render it with V-Ray.

TEXTURING THE FACE

I textured the face in ZBrush using ZappLink. I used a photo reference, and projected it onto the head mesh. After some corrections I exported it to 3ds Max. I also used a subsurface mask and a specular map for the skin. For the details I created a displacement map in ZBrush. I rendered with V-Ray so I used the standard V-Ray material with the translucency function. This, in my opinion, works much better than the V-Ray fastSSS1. In **Fig.03** you can see the settings I used.

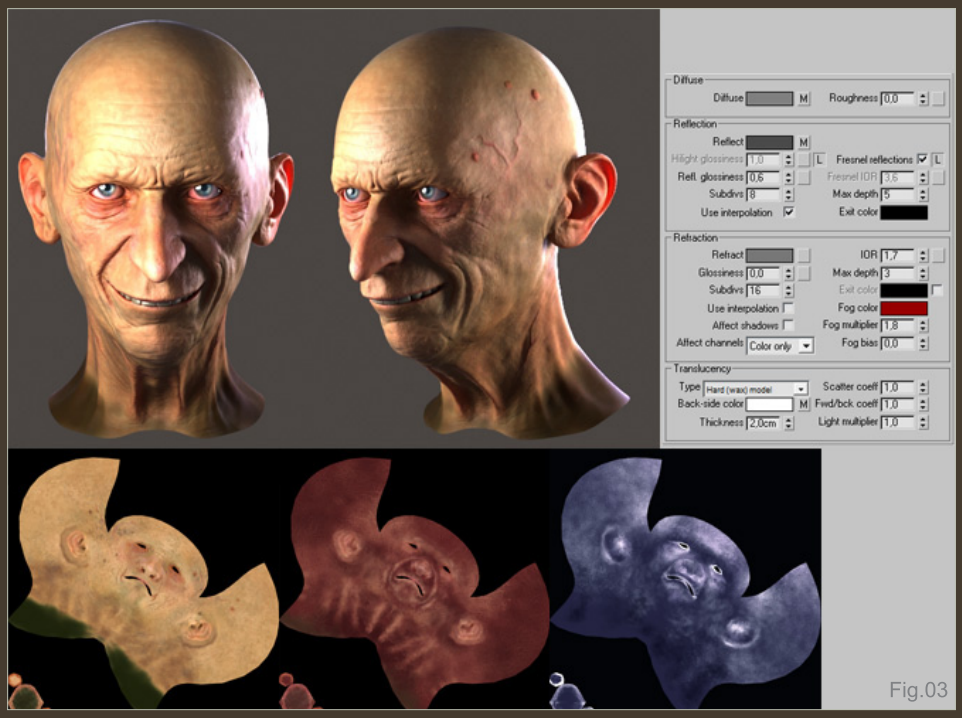

Fig.03

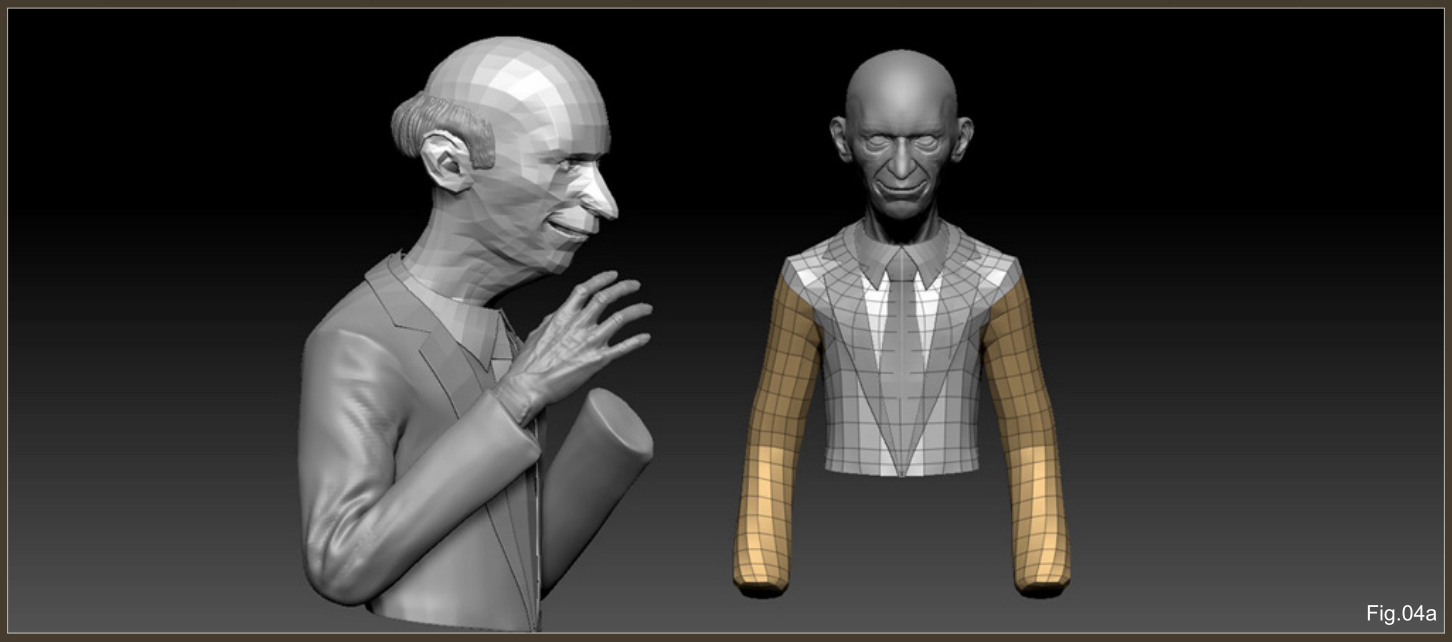
Fig.04a

Clothes

I used box modeling to create the base meshes for the jacket and the neck tie, which I then imported to ZBrush. After correcting the proportions, I used the retopology tool in ZBrush to “paint” the mesh for the collar on the jacket. These new collar meshes were then imported to 3ds Max where I extruded them. Back in ZBrush I posed the arms and started modeling the details and folds (**Fig.04a – b**).

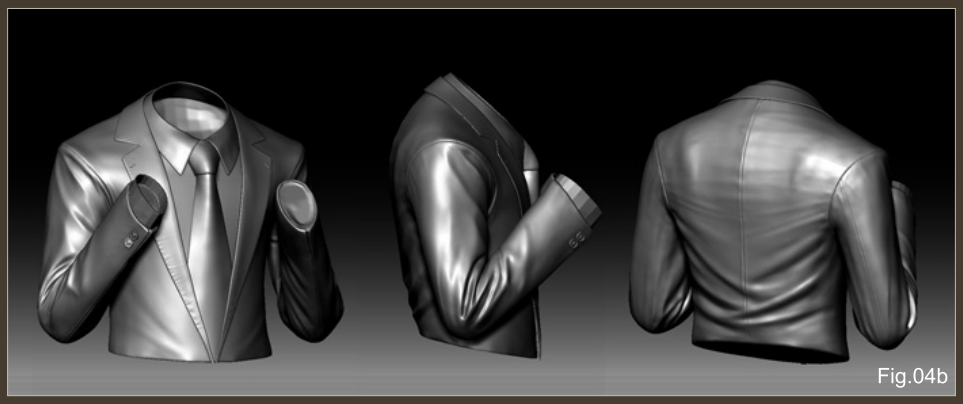
Fig.04b

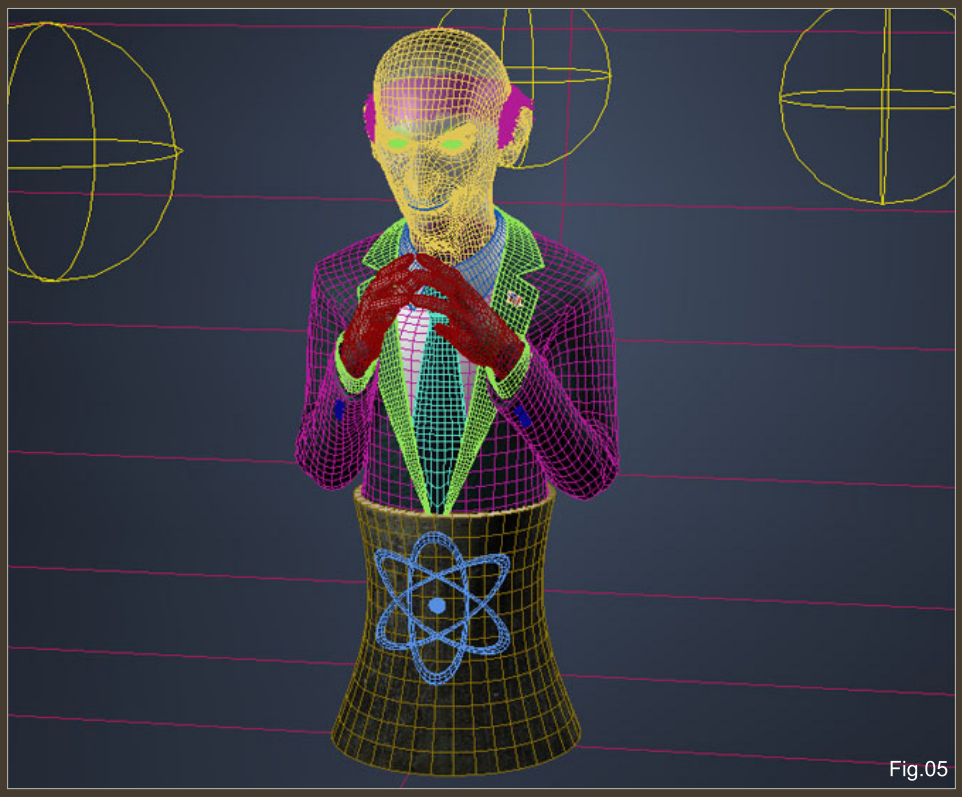
Fig.05

UVW info: all objects were UVW mapped in UV layout. What is important to know is that you have to turn off the UVs in ZBrush before exporting and re-importing meshes.

Lights

When using translucency in V-Ray you should use V-Ray lights - this is to make sure you render the materials correctly. For a nice light set I used three lights, one in the back for some bright shiny borders, one in the back-left and one front light (**Fig.05**).

Post Processing

After I rendered the clean bust of Mr. Burns I decided to make a second version as an old photo portrait.

I used the first render (**Fig.06**) and worked it in Photoshop. I changed the colors to a more

Fig.06

brown-like tone. Then I added an “old paper” texture to the photo. I got this free texture from the net. And last of all I erased all the cracks in the paper texture in the face area.(**Fig.07**) .

I hope this was a little helpful. If there are still questions, then please feel free to email me.

Fig.07

Martin Beyer

For more from this artist visit:

http://monomauve.deviantart.com/

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Digital Art Masters
Volume 4

With the release of 3DTotal's latest book, *Digital Art Masters: Volume 4*, we have some exclusive chapters for you...

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This month we feature:

"Going California"

by Loïc_Zimmermann

Going California

By Loïc e338 Zimmermann

Software Used: Maya, ZBrush, Mental Ray and Photoshop

Introduction

It's all been said, all been explained over and over, I guess – how you start from a low-res mesh, to end up sculpting millions of polygons and rendering the stuff out with fancy candle shaders. When I was told my image would be part of this book, joy was my first feeling … quickly followed by a sudden fear: it's all been said before. So instead of the usual approach, I'll try a different take here in order to explain “why”, instead of “how”, since you should already know how.

My illustration work relies on 3D (although it's changing) since I find myself more comfortable with it for “ideation” (as they call it in concept art) compared to drawing (due to a shameful lack of practice). Most of the time I go for a radical approach and it takes only a few hours to get my character done; it's simple and not textured, but good enough to get started with Photoshop and Painter to end up with, hopefully, something very natural and 2D-ish. Once in a while, I push the 3D side farther in order to end up with a very detailed image, closer to a photographical approach.

Fig.01a

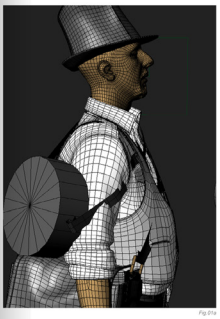


Fig.01b

Fig.02

I wanted to celebrate my upcoming journey into the US, due to a recent job proposal in Venice, California. I thought it would be interesting to make the parallel with those European colonials who took the journey in the late 19th Century, hoping for a piece of gold (although these days the picture isn't the same and the economy is crumbling). Anyway! I took my digital double from the *Longmen's Fall* project (featured in *Digital Art Masters: Volume 3*) and dressed him up to make this portrait, choosing not to go for the pure sepia feeling, although it is always charming, but sticking to a colored image – more Western, so to speak.

Feed the Machine!

Before you even start, especially when dealing with a subject related to history, you must spend some time gathering references. I basically searched for suitcase designs, leather objects, monocles ... just a few items, since the look of the guy wasn't meant to be fancy. Regular clothes, regular accessories; I wanted things to remain simple, and while doing the parallel with the gold rush it had to take place now. The vest was the only “urban” item, as well as the shape of the hat. The pants and the shirt are both very neutral.

I used some temp assets that already existed to create the shirt, pants, vest and hat. The beauty of CG is in building a bank of assets you can reuse, tweak, improve combine – whatever. I hate having to start from scratch (over the years I've lost patience – it's a fact). Anyway, thanks to this method I was able to come up with all that was not flesh in two days or so for the base mesh (the project was done at night). Texturing took a while, but after a year and a half spent on *Heavy Rain* (a PS3 video-game from Quantic Dream), I had some practice and it went smoothly. Plus it was a joy not to be limited by a game engine and able to use 4- and 6K textures!

Having a bank of assets is also a very good thing when you want to deal with textures. UV-mapping is always kind of a hassle, and I like having a good starting point

Fig.03

Fig.04

Fig.05

Fig.06

on all my geometry before I start refining. This gives you a very good base for unwrapping stuff quickly when the tweaking is over.

Clothing & Props

I kept the modeling very simple within Maya, knowing that all the fabric would be done in ZBrush anyway (**Fig.01a – b**). When I had all the elements in the scene, I exported them as .obj files for further sculpting. The initial global sculpting was done in a day. The pose was achieved using Transpose and SubTool master. It's a convenient way when one doesn't want to deal with rigging and skinning, but it's a bit tedious for anyone who has had the chance to play with a nice IK/FK rig!

When the posing was achieved, I made an additional pass of sculpting to create some matching folds and wrinkles (**Fig.02 – 03**). The leather bag is actually mine (**Fig.04**); I thought it was good to include some contemporary elements in the image, and references for it were easy to get. I took pictures of it for modeling

Fig.07

Fig.08

Fig.09

and texturing purposes, using an indirect and diffuse “daylight” to avoid sharp specular highlights.

Once the modeling was done I made a compact UV layout (all elements related to the bag in one layout) and started to copy and paste photos onto it. Using the Stamp and the Healing brush tool I filled in all the gaps and fixed the specular highlights. Using the Liquify filter I tweaked the texture so it matched my UVs perfectly. Then I painted details on top and generated additional textures (spec, bump). This same method was used for all the objects (**Fig.05 – 06**).

It's important to put some love into the details of your textures (**Fig.07 – 09**). Breaking the edges with a specular highlight is a good start – think of what it's like in the real world. You can then say yes, this is because the surface is softer, or glossier, and then you can update the diffuse and bump accordingly. Experience of videogame texturing is a very good thing, since you have to pay a lot of attention to your textures, with simple shaders on top and size limitations. You often have to force things a bit so they work under most conditions. For rendered projects you have to be careful not to overdo it too much, but still, it's good to help the shader a bit!

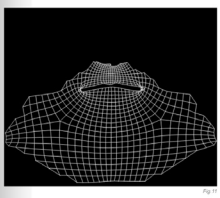


Fig.11

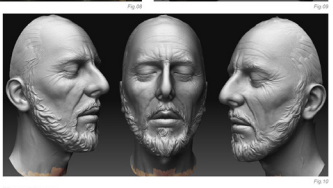


Fig.10

The Head

The face I did for the *Longmen's Fall* image was alright, but I wanted to add a little more aging to it. Since the character has a hat and some hair I ended up cutting a mask into the face in order to reach a higher poly count. Since the head was attached to the torso and arms I was limited to a global 5 million polygons. By doing this I was able to reach the 5 million I needed on the face alone. My computer tends to crash beyond that (**Fig.10**).

Initially I wanted to have a pure, traditional sculpted feel to the beard. There were two reasons to this – the first being that it's cool, and as much as I dislike those CG copies of classical pieces there are some fantastic things happening in old school sculpting that are very inspirational. What I mean is: copying a real sculpture with digital tools is a piece of cake compared with what it was to practically do; I just find it a bit hypocritical. The second reason is because fur is another thing I hate doing. So I had to open the gates of hell and go for the fur. Laziness shall always bow down to the necessities of an image! The sculpting approach couldn't render the fuzzy feel I needed to fit in with the elements already composing the picture (which were pretty realistic). But at least it helped with giving a solid base to the fur, and it was really fun doing it.

I extracted emitters from the geometry of the face to make the fur work a bit easier (a matter of taste). This also allowed me to scale up the UVs and be able to use smaller textures for both colors and weight attributes (**Fig.11**). I baked the color of the face onto those new UVs since it had the beard painted already. This gave me a nice matching color that helped with integrating those damn hairs. I adjusted the color gain in Maya for specific attribute variations. This is usually fair enough (tip color vs. root color) and keeps the file tracking simple (**Fig.12**).

The following shots of the “Going California” book pages are featured here in full-resolution and can be read by zooming in...

I ended up painting additional hair in Photoshop to make it look more convincing. Next time I'll skip the fur stage for real and jump directly to the painting. I understand the appeal of making it fully in 3D though – that little “playing God” thing that happens. But let's be serious, for creating just one image it just doesn't make sense at all!

Assembling Passes

In the end I had something like 600MB of textures for this guy. If you add displacement for most of the elements and a naughty SSS of some elements and raytraced shadows, you have enough to scare any CPU to death! I was using 2K textures for my tests, but in the end it was the 4- and 6K that I wanted. So I broke the scene into passes: clothes, bags, body and face, monocle and hat, and the fur. I also rendered some additional passes for the specular, occlusion and HDRI. I ended up replacing some of the specs with some heavy reflections. Although it's obvious this was going to be better, I always try to see how far I can go with regular specular before choosing Raytrace. One could say it doesn't really show in the image (it could be improved – I'll give you that), but hey, it does the trick (**Fig.13**).

Although the close-ups with full-res textures I did were looking alright, when I had all the passes assembled in Photoshop for the first time, I realized the lighting was not good at all. The shaders were not as nice as they were with a simple direct lighting with HDRI. Their behavior in sharp lighting was as poor as it could be! But with only one day of work left in my schedule, I really had no time to redo it. At this point, I saw myself throwing the

computer through the window ... but then I thought it might hurt one of my cats and decided to do my best with Photoshop.

Using adjustment layers on Levels and Hues first, I painted masks to push values in the highlights and the shadows, giving more “punch” to the image. A second set of adjustment layers was used to push the colors, giving more life to the character. The third round was made of textures, stains, scratches ... and some “discreet” paint-over. I added a quick matte painting for the background and tweaked my colors again so the whole thing worked together (**Fig.14 – 15**). The last two hours were used painting additional details, seams, tiny shadows, textures, hair ...

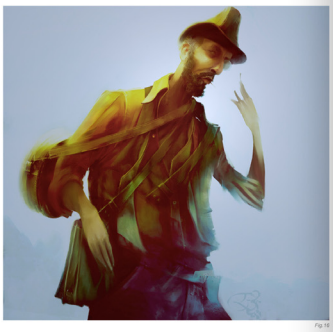
... and we're done.

Conclusion

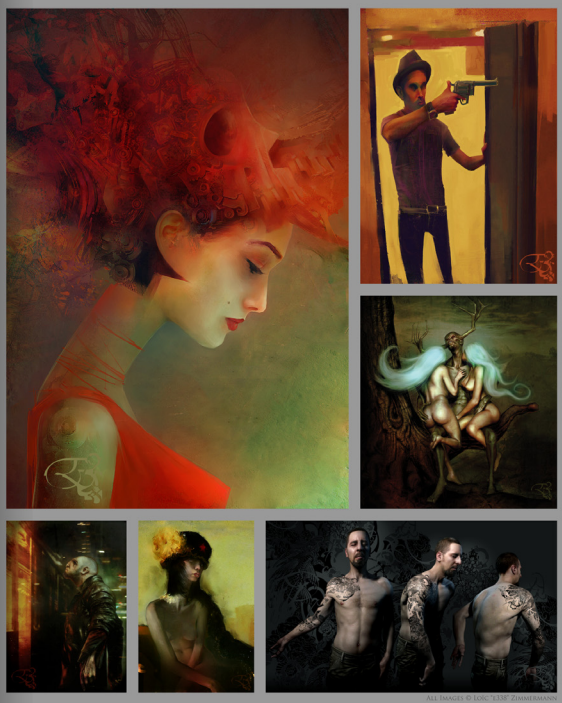
If you ask me now, I think the result is way too shy and I would go for something drastically different. I had to keep it quiet for the posing and this has been bugging me a bit. On the rendering side, something with much more contrast, dark shadows, straight from *Pale Rider* would be good as well. Considering the clothes, and since I'm really back into the 19th Century these days, I would go for a neat gentleman's shirt, pants and jacket, bruised by travel. But this is it: an exercise that turned out to be a nice experience, and gave me the chance to polish up some of my techniques.

This image is most likely one of the last of its kind. Texturing and shading no longer get my attention for personal work, but I still enjoy sculpting a lot. Lighting is also something that can be fast, and with those last two, you've got a good half of the work done already. But it's good to go through all these steps and to learn, trying to get a global picture of 3D. It allows you to understand what the folks you work with are doing, and also helps you provide them with what they need before they have to ask. As a Lead or a Supervisor, it also helps not looking like an ass because you don't know what you're talking about!

It's also important to figure out what you really need, and then dig into all those and make them your own. They – the tools, the software – should always be a fast track between you and your finished concepts. It's good to get rid of any useless baggage ... Is this the real story behind this picture? Well, I don't know; I left a lot behind me when I moved to California, for sure, but it doesn't feel any lighter at all (**Fig.16** – the remake).



Artist Portfolio



3DC next month

Here is what's in next months issue of 3dcreative

Tutorials

Mudbox Female Character Creation:
Chapter 4 - Zombie
by Wayne Robson

How to Stylize and Model Toon Animals
Chapter 3 - Materials & Lighting
by Jose Alves da Silva

Environment Lighting: Indoor Scene
Chapter 3 - for 3ds Max + Vray
3ds Max + MR, Maya, Cinema4D

Introduction to Rigging
Chapter 4 - for 3ds Max & Maya

Interviews

Maarten Verhoeven

Galleries

another **10 of the best**
Images from around the world!

Making of's

Making of Max & Milton
by Jason Baldwin + Joe Beckley

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3ds max
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Environment Lighting

This five part series will focus on the topic of setting up a variety of lighting rigs that reflect natural lighting at different times of the day and manmade interior lighting. Each of the chapters will use the same base scene as a starting point, and will show a step by step guide to finding a lighting and rendering solution that best reflects the desired lighting situation.

The tutorials will explain the type of lights used and how to set up the parameters along with talking about the different methods of tackling the subject. The manipulation of textures may also be covered in order to turn a daylight scene into night scene for example, as well as a look at some useful post production techniques in Photoshop in order to enhance a final still.

CHAPTER 2 - BROAD DAYLIGHT

Software Used: 3ds Max + mental ray

COHERENT PLAN

Preliminary steps

Expectations, time and budget:

It is very important to have a clear understanding and vision of the scope of work, content and the final product expected by the artist and/or client.

This often involves notes, sketches and/or animatics of the entire project.

Choosing the most efficient and least compromising approach to working is very important when evaluating the time required to deliver the final product. This process also involves choosing the most appropriate and adequate software for the project or creating proprietary ones, if required!

All the above mentioned will ultimately determine the total cost of the final product.

COMPOSITION

It is always important to search for references (photos, movies etc) when deciding on the final composition of your 3D scene.

Prior to beginning in Max, ensure that the system's unit scale is set up! This approach will prove vital for the integrity of your entire project.

The 3D contents of your scene will ultimately determine whether or not your final image is appealing and/or realistic. The design, colors and attention to detail are one of the most important aspects of the final image! The rule of thumb is to choose models that are attractive and appealing, and that also complement other objects in the scene. In addition, one should avoid having too many symmetrical 3D models.

Asymmetrical 3D models are perceived to be more attractive, appealing and realistic (i.e. organic shaped objects, organic elements such as plants, humans etc)!

Fig.01

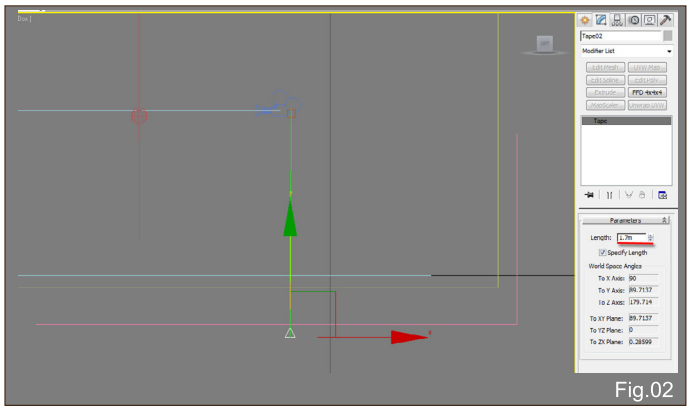
Fig.02

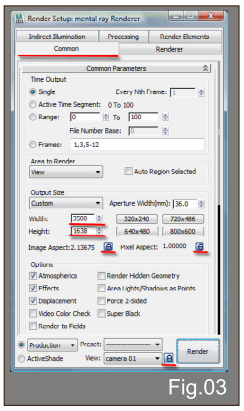
Fig.03

If it is inevitable that you will use some symmetrical models, so you should make the effort to add so small modelling details and subtle irregularities (i.e. subtle scratches, bump, chips etc) to make it more realistic (**Fig.01**).

At this early stage of the process one should start to block the scene by first placing every draft replica of the final 3D models to quickly assess their integration in the scene with the camera.

CAMERA & IMAGE OUTPUT SIZE

The camera position and its settings play a crucial role in producing the final render.

It is very important at this early stage to decide how one wants the final image to be interpreted through the camera lens (i.e. in an artistic, cinematic or standard photography manner)! Even untrained eyes can quickly assess whether or not an image is realistic, based on how the camera is positioned and/or setup.

It is common practice to have the camera positioned (i.e. eye level or another realistic position) and set up in a realistic way (**Fig.02**)

Camera parameters and/or irregularities such as depth of field (DOF), vignetting, exposure controls, chromatic aberration etc., will also help to improve the quality of the final image.

Similarly the camera's field of view (FOV) should reflect the values commonly used with real cameras, coupled with the appropriate render width and height output size to help capture the scene's essence (portrait/landscape). The final result should be based upon how well the camera, scene and its contents complement each other... in a dramatic and effective way, preferably (**Fig.03**)!

Mental ray and Max are equipped with the necessary tools to accurately achieve all the above mentioned!

Detail Modelling:

The use of references is very important when selecting and/or modelling realistic objects. Firstly, one should concentrate mainly on detailing objects that are closer to the camera.

Objects in the distance will often look acceptable with a simple nice texture and bump/displacement applied to their respective shaders. It's also vital to model/scale 3D objects realistically. As mentioned earlier, setting up the units' scale is a good starting point.

Moreover, it is vital to look for references of scale relationships between items in drawings and photos and around you. The human eye can inexplicably spot inaccuracies in scale relationships, when apparent!

Finally, when creating and adding detailed geometry to the scene it is worth finding an efficient way of navigating in the viewport by occasionally displaying some/many less relevant objects as boxes. This speeds up Max's performance whilst navigating and opening the Max scene. Although not necessary for this scene, creating mental ray proxies is another method of working and rendering efficiently (**Fig.04**).

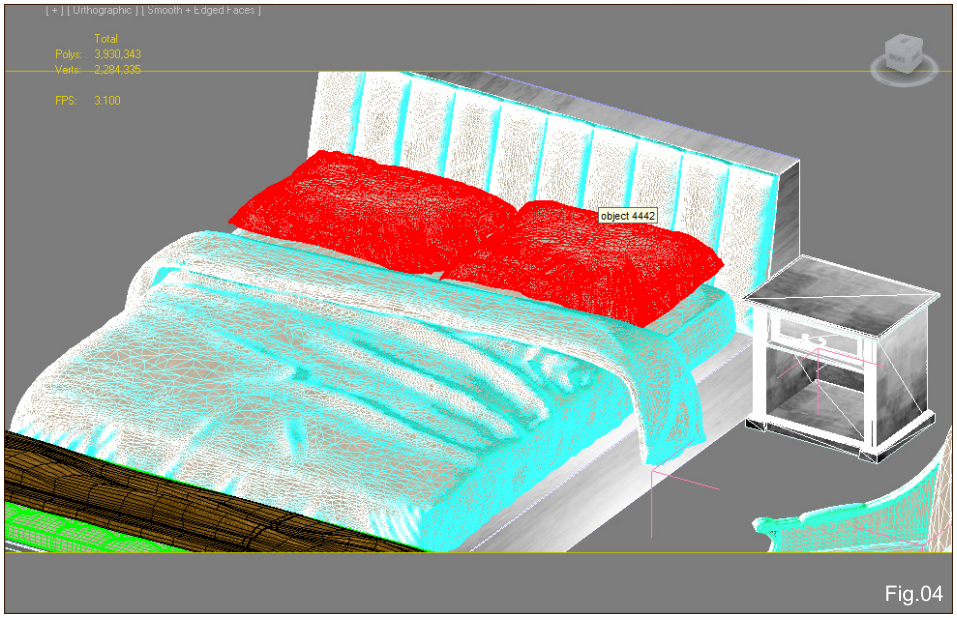

Fig.04

Importing/Merging 3DModels

When sourcing or/and using 3D models from a third party, it is worth "stress testing" them in a separate file, looking for missing bitmaps, core crucial parameter changes, internal fatal bugs, or renderer conversion errors (i.e. some vital settings may require changing). The internal fatal bugs may manifest themselves in a form of "black splotches", ridiculously slow render times etc. These bugs are often created accidently in the process of converting scenes across platforms, across rendering engines or simply a deliberate malicious act! In some extreme circumstances, users may find themselves having to individually render hundreds of objects in order to detect the "rogue" object/s.

These precautionary measures will later prove crucial in the process of finalising your project in an efficient and professional manner.

Proprietary Shaders and Textures

Technical approach: Over the years mental ray has created settings and developed shaders to emulate almost anything... realistically or unrealistically! By default some of its default parameters are either too high or too low, and others need to be enabled or disabled, occasionally.

Shaders and textures are the second most important aspects of a render.

Before starting, it's important to have all the relevant photo references at one's disposal and to set the Gamma LUT/Correction correctly in your Max scene.

The shaders and textures should reflect the physical properties depicted on the photo references. One should focus mainly on physical properties such as glossiness (i.e. shine), reflectivity, transparency, color, bump/displacement values and how they react to light. Glossy highlights, reflective objects and displacement maps are the usual contributors in making an image appealing!

Fig.05

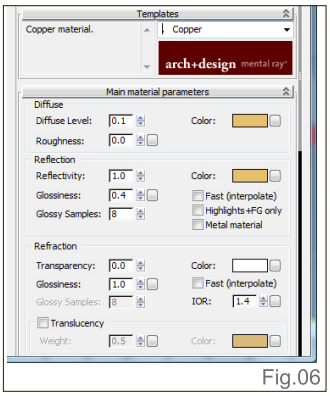

Fig.06

The surface textures are equally important as there appearance needs to be accurate (i.e. correct color, tiling; sharpness etc). Mental ray is equipped with all the necessary tools and settings to control these parameters (**Fig.05**).

It is common practice to initially apply the basic shader parameters and textures, followed by test rendering them without any FG pre-

calculations or lights, for quick results (**Fig.06**). These parameters are later tweaked when the lighting and most mental ray global parameters are being refined.

There will be further final refinements to the shader and textures at full resolution (i.e. crop/region renders), to accurately assess their physical properties.

Finally, one should continuously name the shaders/materials according to their original shader creation and/or object name. Also, add material ID numbers whilst the shaders/materials are being created, to be later rendered as material ID elements (**Fig.07**).

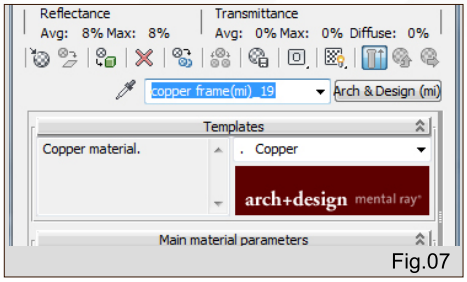

Fig.07


Fig.08

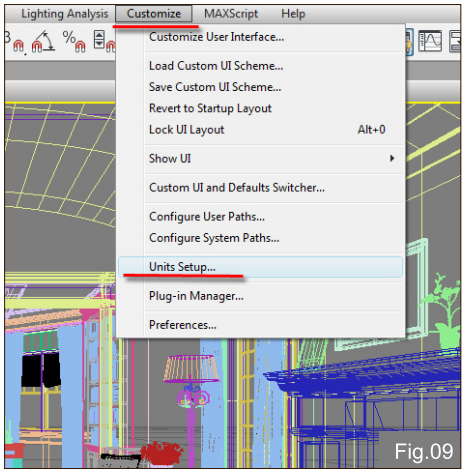

Fig.09

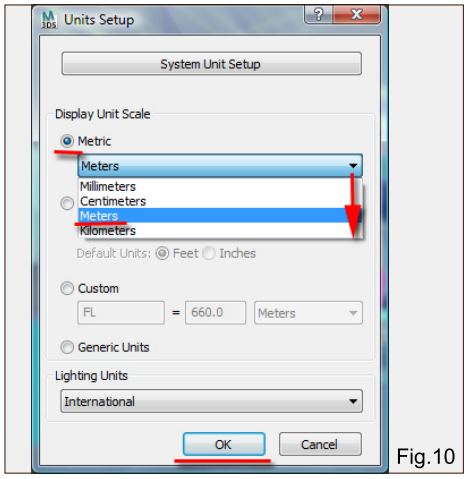

Fig.10

Arranging Objects in the Scene

To help improve the scene composition further, one should place some 3D objects randomly in a subtle way.

For instance, having too many neatly and symmetrically placed objects may give away the CG scene. Essentially, in a fraction of a second our eyes can “assess” that it is not a natural occurrence, as in real life it would be a mammoth and almost impossible task to achieve such symmetry and neatness. So the rule of thumb is to place objects in a natural and realistic manner (i.e. cloth naturally draping on a chair, subtle untidiness etc) (**Fig.08**).

Starting with Shaders and Textures

01 - Let’s start by first opening up the Max file.

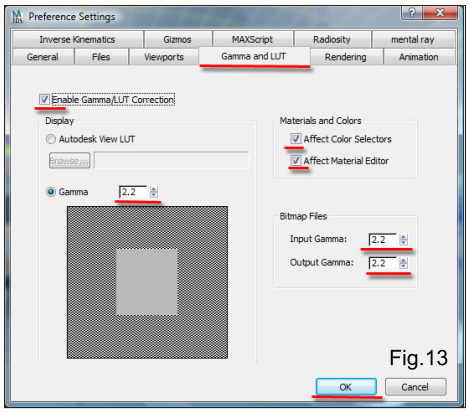

Fig.13

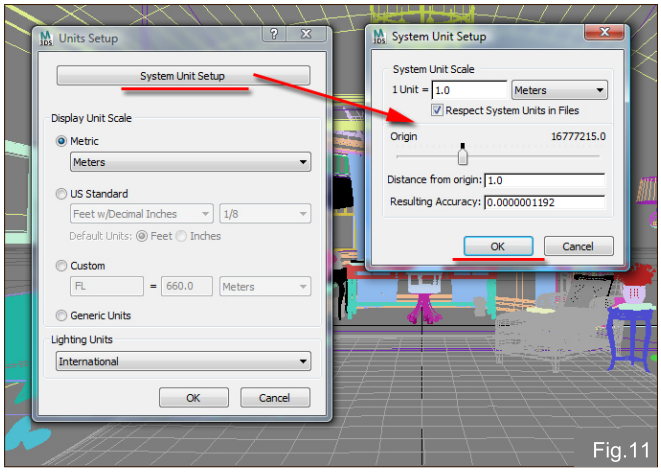

Fig.11

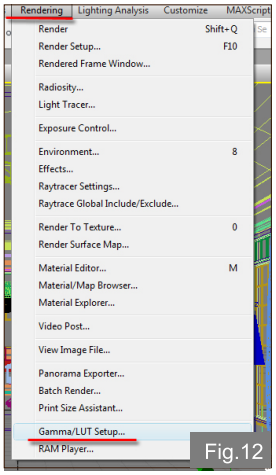

Fig.12

02 - With the file opened, it is important to check two main parameters: The Units Setup and the Gamma LUT/Correction. The correct unit’s setup will prove vital when adding values to displacement maps, shader corner radiuses etc. Enable it and set it to Meters, as most practices work in meters (**Fig.09 – 11**).

03 - The Gamma LUT/Correction values are equally important as it’s essential to work in the correct color space. Enable it and set it as in **Fig.10** (**Fig.12 – 13**).

It is worth mentioning that although the Gamma LUT/Correction is the appropriate method of working, numerous companies choose not to enable it on the basis that it slows Max’s display performance heavily (textures etc) and it also tends to add a whitish hue to the rendering, at times.

04 - The next step is to load the mental ray renderer and begin creating the shaders and textures.

Open the Render Setup dialog box, by clicking on its icon on the main tool bar. On the Render Setup, scroll down to the

Assign Renderer rollout, assign the mental ray renderer by clicking on its toggle and picking it from the Choose Renderer dialog (**Fig.14**)!

05 - We can now begin creating shaders and textures. The first material to start with is the lamp's pedestal:

- Open the Material Editor (m).
- Select the lamp pedestal object in the scene. You may first need to open the group. The name should be "object 4447".
- Back in the Material Editor, select an empty material slot and load the Arch & Design (mi) (**Fig.15**).

06 - When looking at our original photo references, the lamp pedestal we are trying to emulate is of a copper appearance. Copper materials have very distinctive shine, colors and surface appearance. Mental ray has a specific shader that meets these physical properties.

- Load up the "copper" material from the templates list, and assign it.

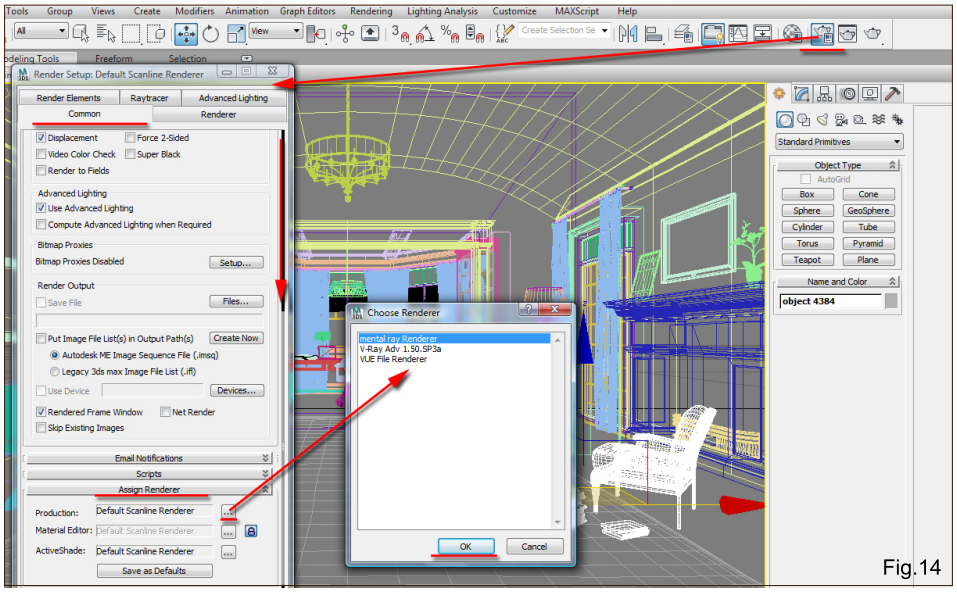

Fig.14

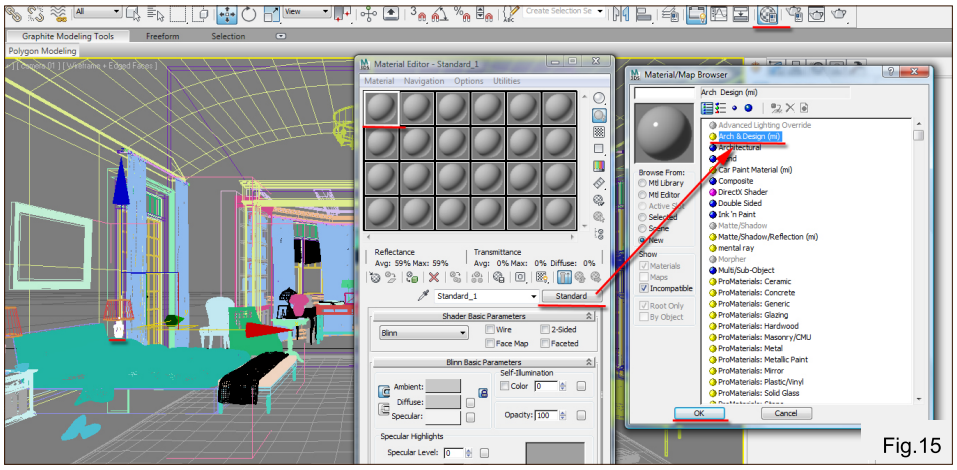

Fig.15

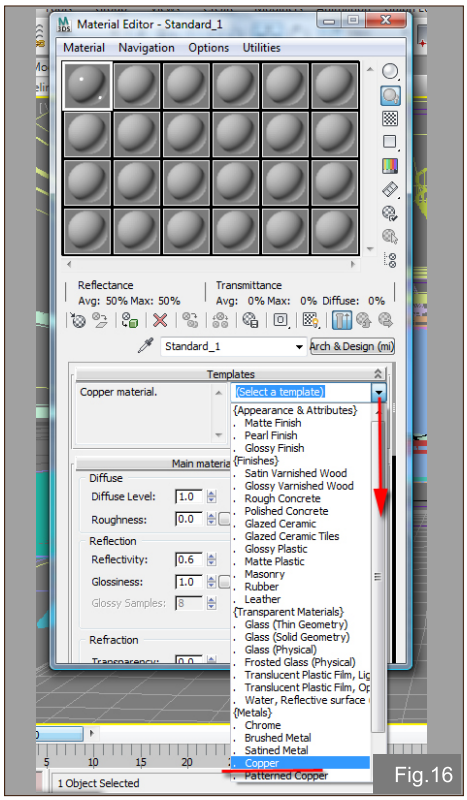

Fig.16

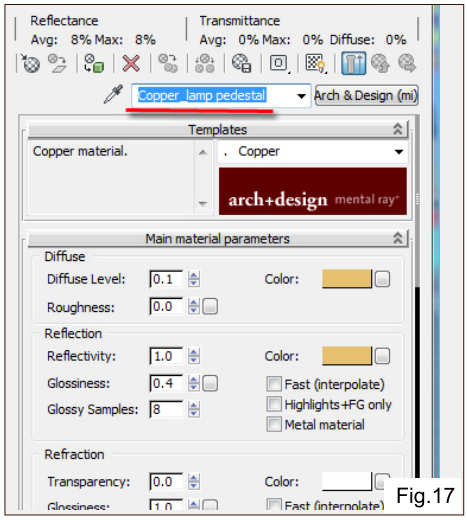

Fig.17

- Name it according to its template name and the name of the object it was originally applied to. This methodology work is to help keep track of the core source of each shader, after major changes to its original parameters (**Fig.16 – 17**).

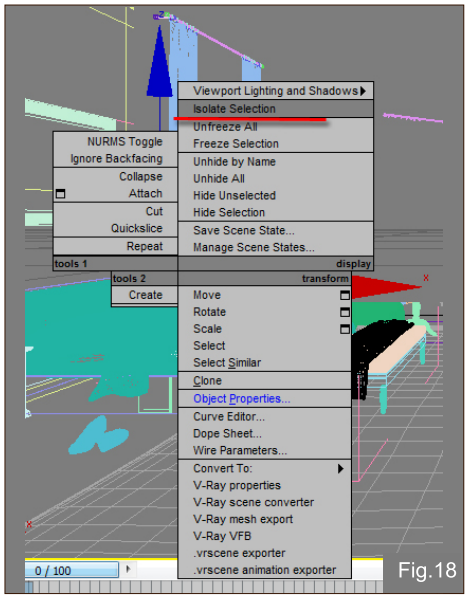

Fig.18

07 - For quick results, isolate the pedestal object by right clicking and choosing the Isolate Selection function from the pop up list (**Fig.18**).

08 - Since we are only concentrating on shaders and textures at this stage of the process, it is wise to disable the FG process and keep the render Sampling Quality low. Click render, (Shift + Q), to assess the shader applied.

If the selected object is in the distance, simply change the camera view to Perspective (P) and Zoom Extent (Z), for a close up render. Perspective and camera views are accurate when rendering; however "orthographic" view renders are not (i.e. renders with artifacts at times) (**Fig.19 – 21**).

09 - It is not wise to make major changes to the shader's parameters at this stage, as there will be further tweaks once the lights have been applied. However, there are certain fundamental changes that need to be looked at.

As mentioned earlier, there are some mental ray parameters that are set to draft and/or are disabled by default. The first that one has to pay attention to is the glossy samples.

Scroll down to the Fast Glossy Interpolation parameters, and change the Reflectivity

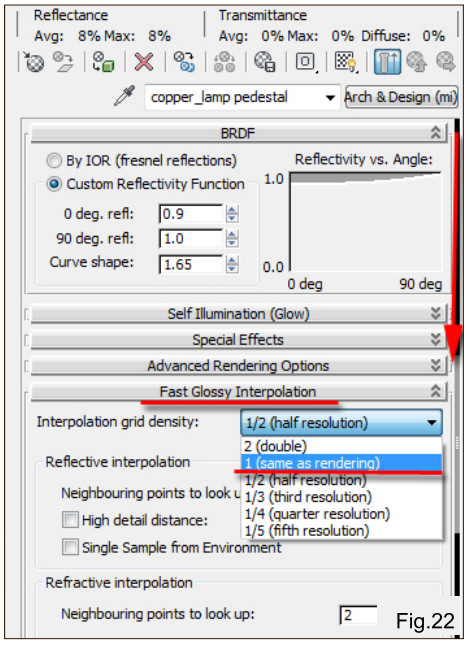

Fig.22

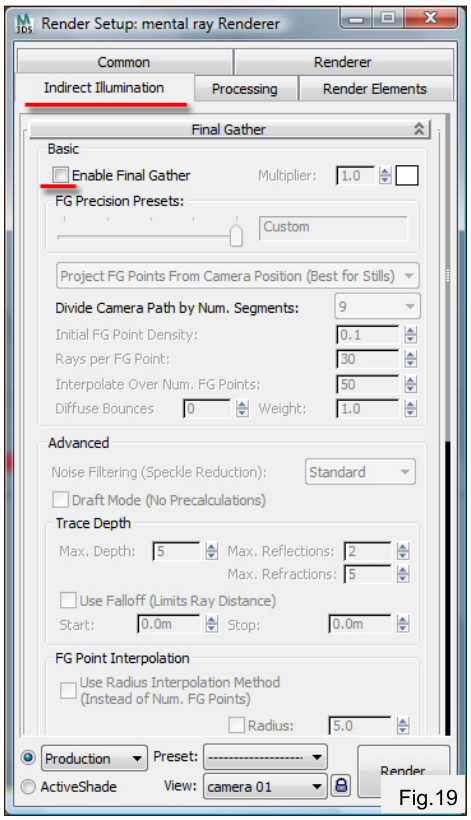

Fig.19

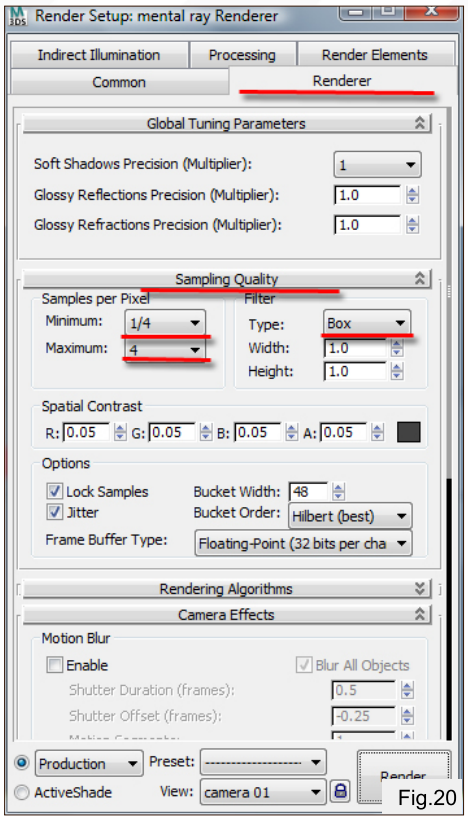

Fig.20

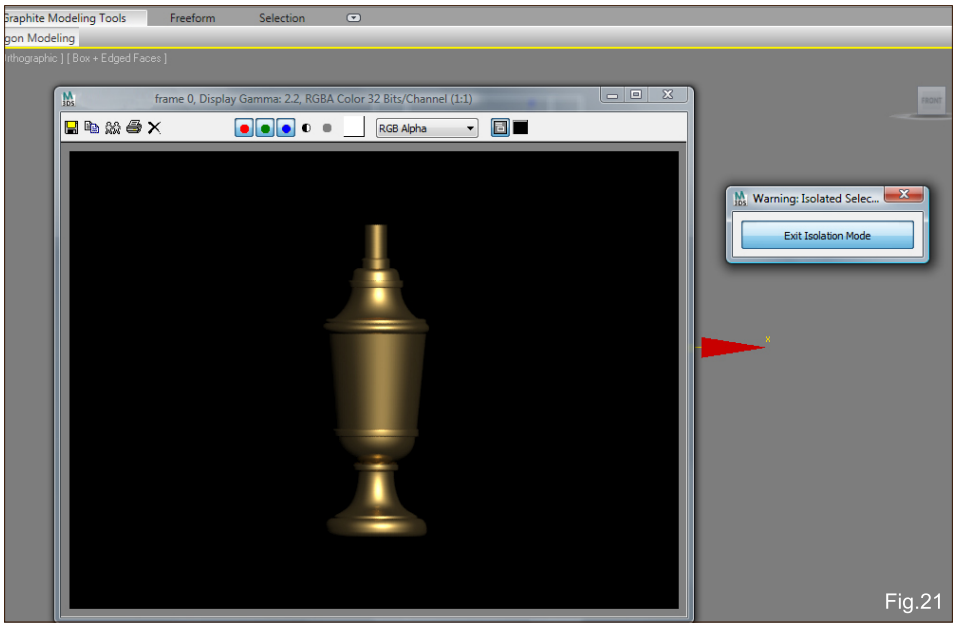

Fig.21

Interpolation from "½(half resolution)" to "1(same as rendering)". This new value will prevent glossy artifacts from occurring in the final renders (**Fig.22**).

10 - The next function is Round Corners. This function is very powerful and amazingly useful, as it bevels/chamfers the edges of objects according to the Fillet Radius values. These edges often help to accentuate unnoticeable details and glossy highlights, which often adds extra realism to the render. Its results are only visible in the render.

Moreover, if these values are used inappropriately (i.e. too high or too low), it may generate artifacts, or have no affect on the object.

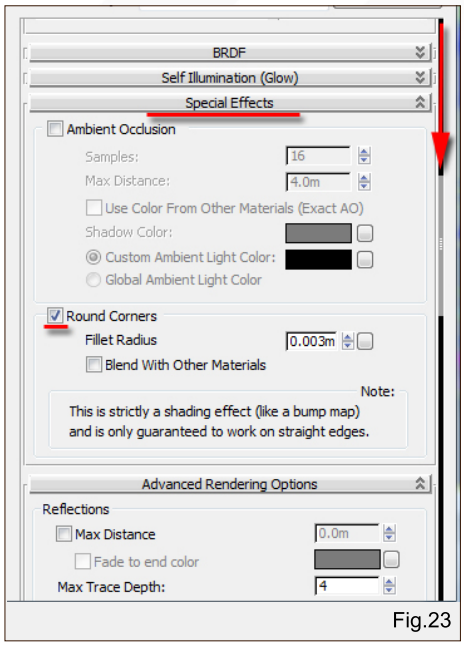

Fig.23

The rule of thumb is to create a Tape Helper next to the relevant object and check the appropriate fillet value.

Another way of finding out the correct value is to create an extended primitive chamfer box object (i.e. not renderable), of similar size to the relevant object, and fiddle with its Fillet Radius to preview the results in the viewport.

The value of 0.003m worked best, however you can try different values (**Fig.23 – 25**).

11 - Another very important shader to pay attention to is the Ambient Occlusion (AO). Although we had set out from the start to use it as an extra element, its global values may not affect very minute object details in the distance. On occasions such as this, simply apply the AO to the Diffuse toggle:

- Pan up to the Diffuse color swatch; right click and copy its color (**Fig.26**).
- Enter its toggle and pick the Ambient/ Reflective Occlusion (3dsmax) shader, from the Material/Map browser dialog box (**Fig.27**).
- Its basic parameters should load up. Paste the previously copied color onto its Bright color swatch **(Fig.28**).

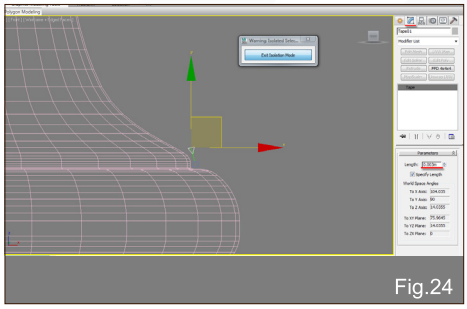
Fig.24

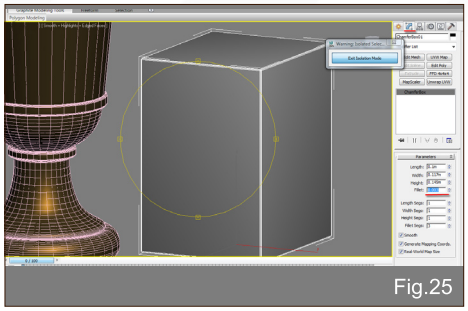
Fig.25

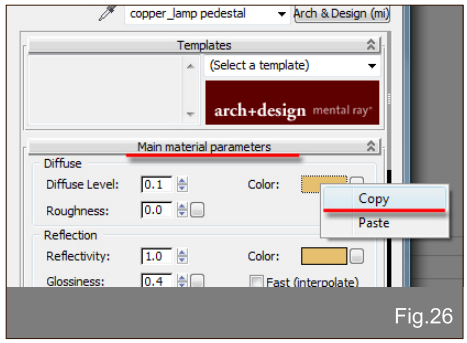

Fig.26

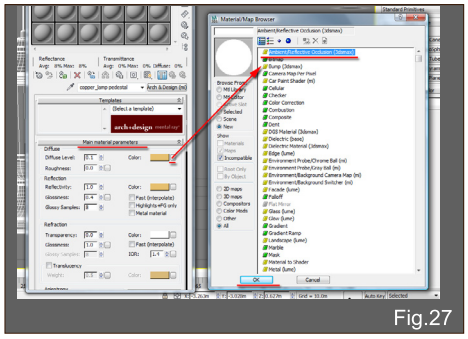
Fig.27

12 - From all the listed parameters, one should concentrate mainly on the first five values:

- Samples: This value determine the visual accuracy of the AO (i.e. 1=very draft; 60=very smooth). Set it to 45.
- Bright: It is often used to override the diffuse color; its toggle replaces the diffuse bitmap, when used.
- Dark: Sets the color of the occluded objects.
- Spread: Sets the radius of the occluded areas. Set the spread value to 3.0.
- Max Distance: Sets the gradient of the spread values (i.e. 0.01=small gradient; 1=big gradient). Set it to 0.2.

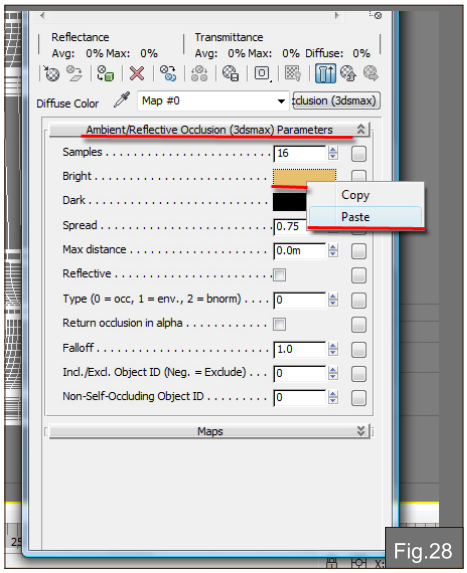

Fig.28

As this scene is set in meters and with correct scale, the above values worked well. However, one may try different values if not satisfied (**Fig.29**).

Assign this shader to all metallic components of the lamp.

13 - The next object to work on is the lamp shade.
Select another empty material slot from the Material Editor, and choose the Pearl Finish shader template, from the list. As previously mentioned, name this material according to

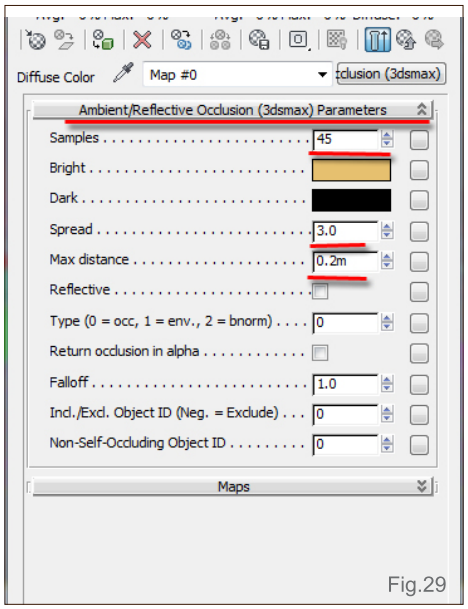

Fig.29

the object's name it was assigned to and the shader template chosen, or vice verse (**Fig.30**).

14 - Its parameters should load up.

As some of mental ray parameters are set to draft, the first parameter to disable is the Fast (interpolate) function. It is enabled by default for fast turnarounds when processing the glossy reflections. As a result some artifacts may occur; to prevent such, one should disable it (**Fig.31 – 32**).

15 - Most lamp shades are not reflective however, as mentioned earlier, glossy reflections often make an image more appealing.

- In the reflection group, increase the Reflectivity value to about 1.0 (i.e. 0.1 = low reflection; 1.0 = high reflection).
- Also, increase the Glossiness value to about 0.68, for semi-sharp glossy effects (i.e. 0.1= diffused/blurry glossiness; 1.0 = sharp glossiness).
- Since we are mainly interested in the glossy effects, we are going to enable the Highlights + FG only function. This function essentially disables the reflections and

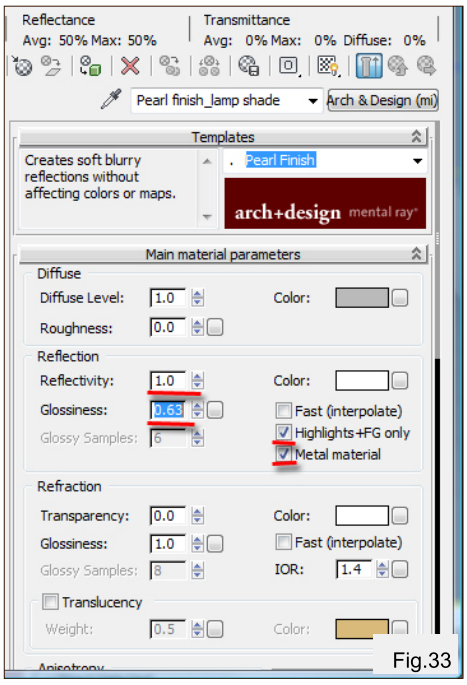

Fig.33

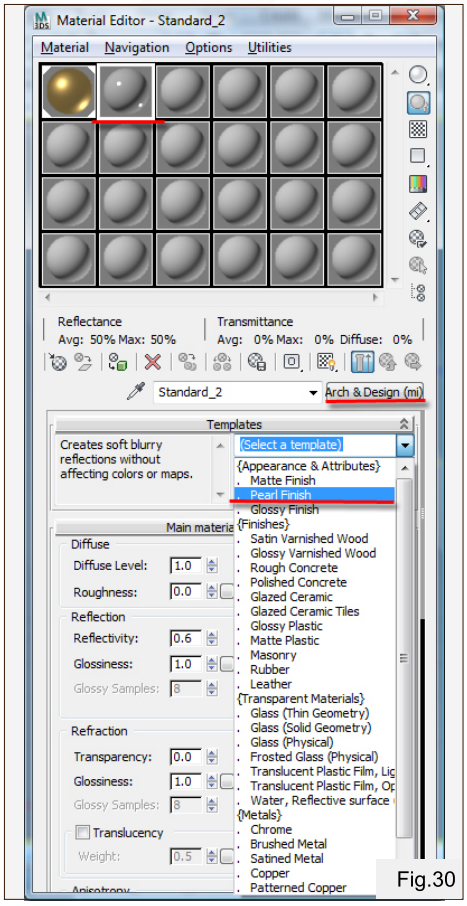

Fig.30

retains the glossy effects, which will subsequently improve the rendering times greatly.

Moreover, when this function is enabled, the glossy sample values are automatically disabled (greyed out), as it works mainly in conjunction with the reflectivity values (i.e. 0.1 = draft/artifact glossy reflections; 16 = high glossy reflections).

- Another very useful function to use is the Metal material. When enabled it

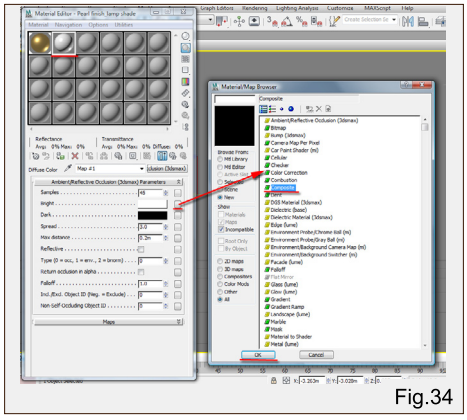
Fig.34

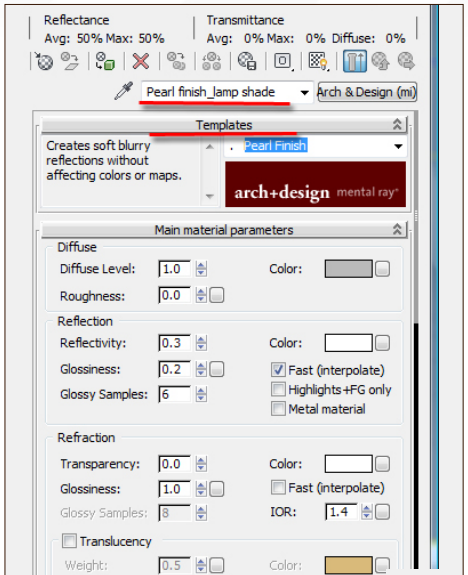

Fig.31

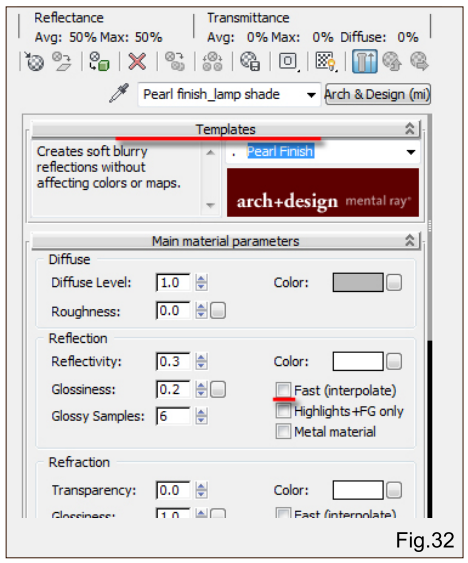

Fig.32

accentuates the Diffuse color or its toggle components. It is very useful to capture the true color of a material especially when its reflective (i.e. reflections often mix the Diffuse Color with environment) (**Fig.33**).

16 - In this instance we will use it in conjunction with the Composite shader to capture the true white color of the lamp shade.

- Apply the Ambient/Reflective occlusion (3dsmax) shader to the Diffuse toggle.
- Open the Bright toggle, and assign the Composite shader to it (**Fig.34**).
- To open its parameters click on the "color correct this texture" button. Its parameters should be opened.

- Click on its Color toggle to source the bitmap from the Material/Map Browser. It is worth mentioning that the composite parameters work best with bitmaps/textures, as opposed to plain colors swatches from Max (**Fig.35 – 36**).
- Choose the lamp shade texture (**Fig.37**).

17 - Once loaded, set its Blur value to 0.01 to sharpen the bitmap and uncheck the Use Real-World Scale function (**Fig.38**).
- Go back to the main Composite parameters by clicking on Go To Parent button.

The next step is to brighten up the white texture color. The brightness and contrast values work well more often than not, but one usually has better results with its Advanced functionalities.

- Enable the Advanced option and set the Gamma/Contrast RGB value to about 10.0. Go back to the main parameters by clicking on the go to parent several times (**Fig.39**).

18 - On the main parameters, there are two more functions to control the glossiness appearance and highlights.

- Pan down to the BRDF parameters. By default, its IOR (i.e. index of reflection) is set to By IOR (fresnel reflections), which is accurate. But there are occasions when one may want to control these values manually. Enable the Custom Reflectivity Function, and tweak the "0 deg. refl." values (i.e. 0.01 = less reflection = wider glossy highlights; 1.0 = more reflection = smaller glossy highlights). Set it to about 0.26. Note that, since the Highlights + FG only option is enabled, the BRDF values will only take effect on the glossy appearance, as oppose to reflectivity and glossy appearance (**Fig.40**).
- Next we are going to invigorate the glossy highlights by increasing Relative Intensity

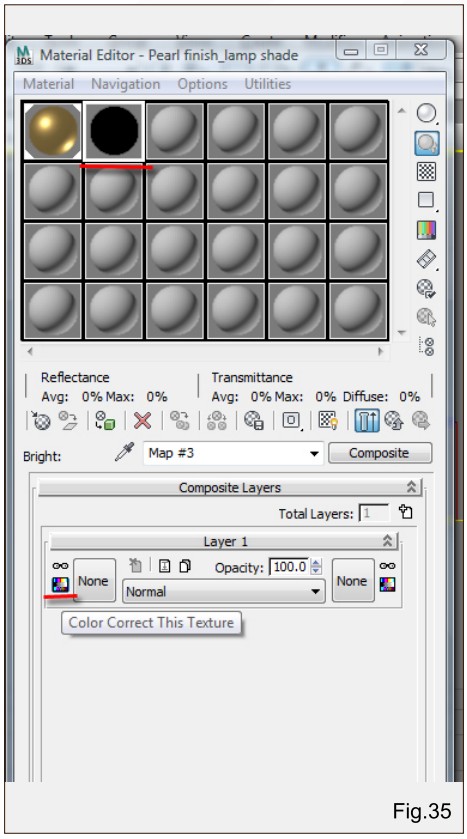

Fig.35

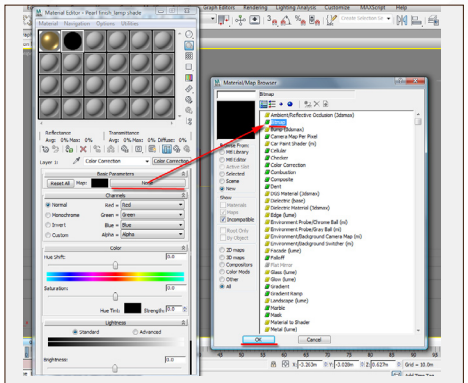
Fig.36

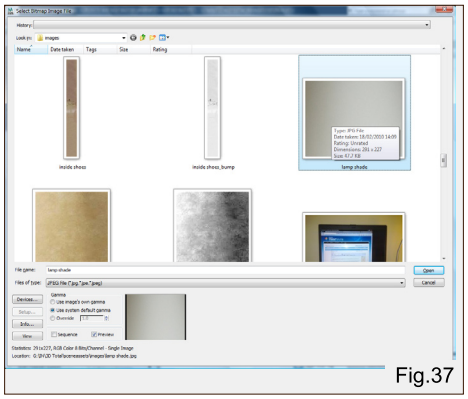
Fig.37

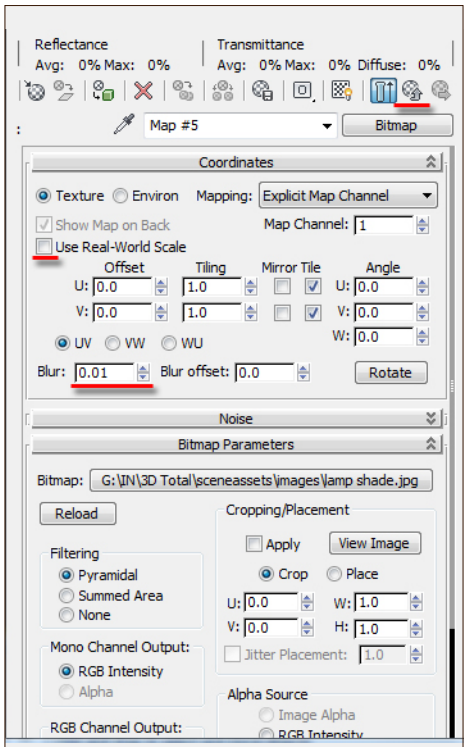

Fig.38

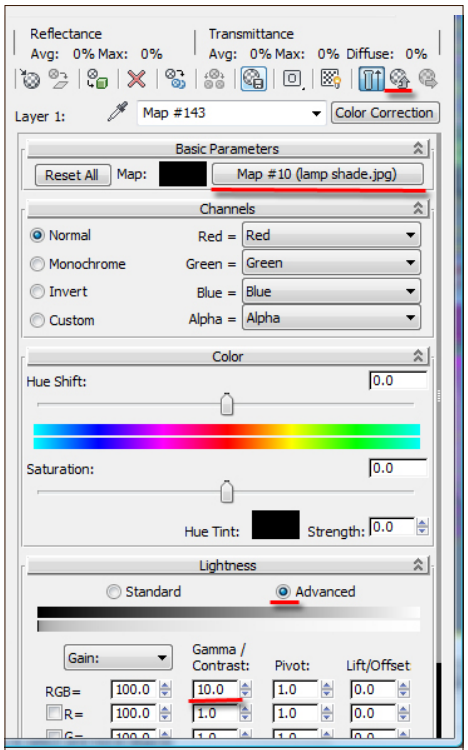

Fig.39

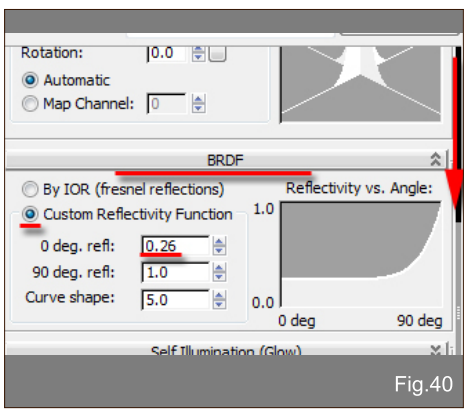

Fig.40

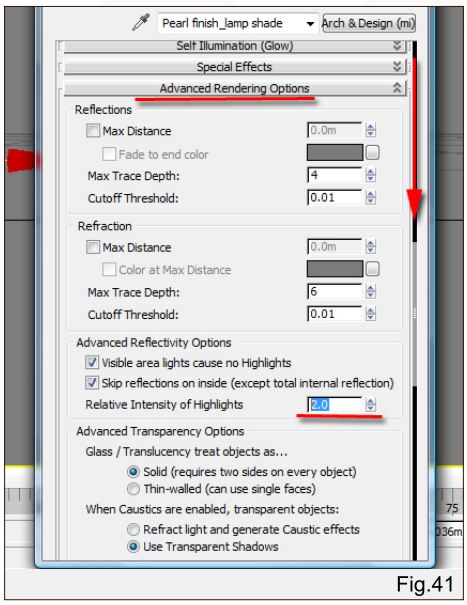

Fig.41

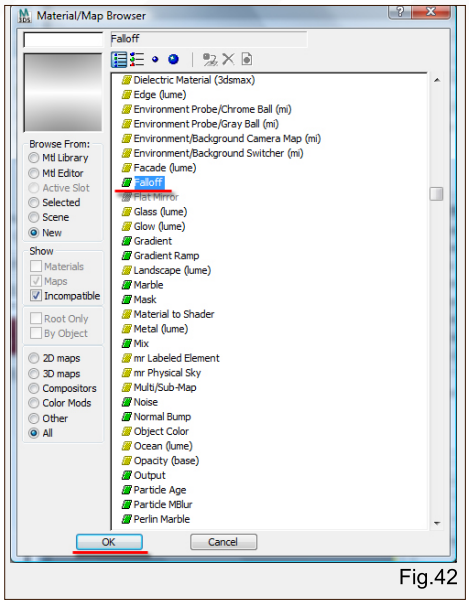

Fig.42

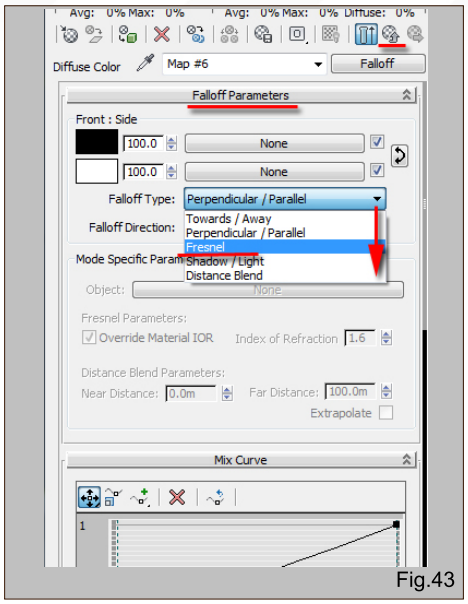

Fig.43

of Highlights to about 2.0. Note that when the lights are added one may be required to increase or decrease the values. Assign it to the lamp shade and do a test render (**Fig.41**).

19 - Curtains are the next material to look at. Looking at photo references, one can conclude that most curtains are somewhat transparent. Moreover, translucent surfaces don't often absorb shadows a great deal.

Finally, a nice satin texture may make it more appealing.

20 - Assign a Pearl Finish shader template to all the curtains in the scene. On the Reflection group, decrease the Reflectivity and Glossiness values to 0.0 to make the surface non reflective/glossy.

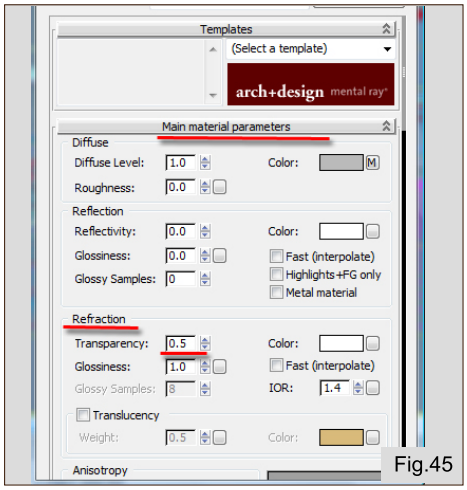

Fig.45

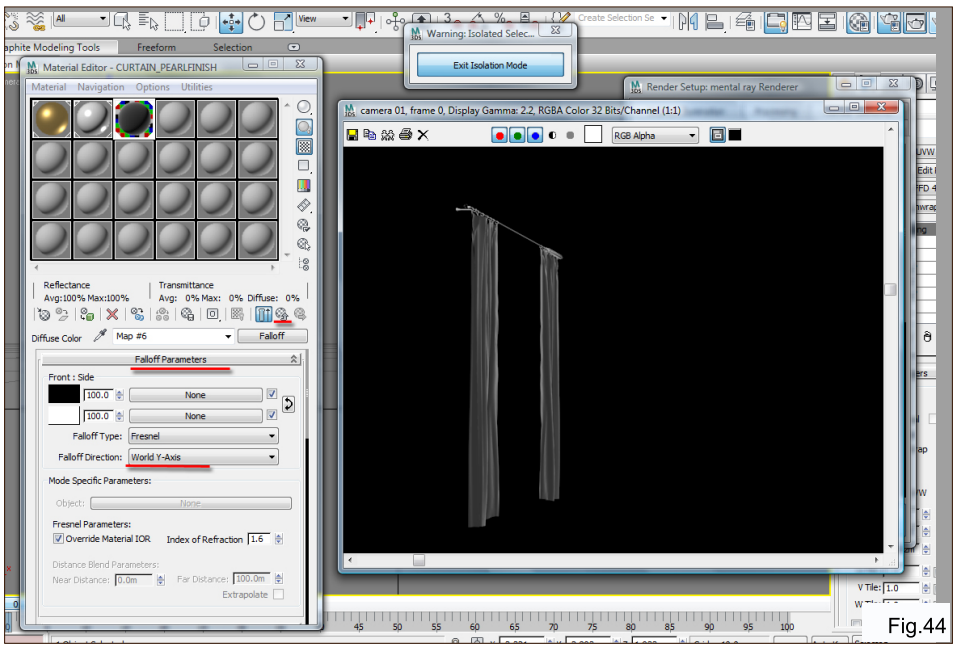

Fig.44

To emulate a nice satin surface we are going to apply the Falloff shader.

- Set the falloff type to Fresnel, to make the falloff between the two colors more apparent! Then test render it (**Fig.42 – 43**).

21 - The Falloff Direction doesn't seem to be as apparent as expected. Change its value to World Y-Axis. Test render again (**Fig.44**).

22 - The falloff seems more apparent now. The next stage is to make it slightly transparent. On the Refraction group, increase the Transparency value from 0.0 to 0.5 (i.e. higher values will result in a more transparent surface!)

If desired, one may decrease the Refraction Glossiness values to Blur (i.e. translucent) however, it may increase the rendering times. The Fast (interpolate) option from the Refraction group prevents such increases of render time, with possible artifacts (**Fig.45**).

23 - As previously mentioned, transparent white curtains don't absorb much shadow. Making the curtain brighter may help accentuate this.

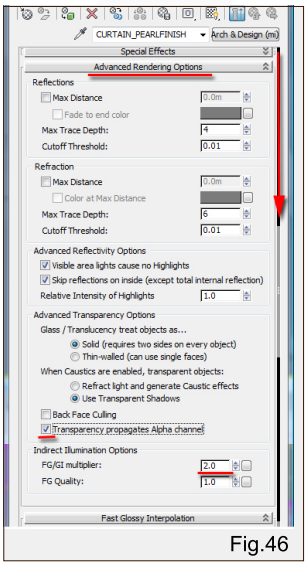
Fig.46

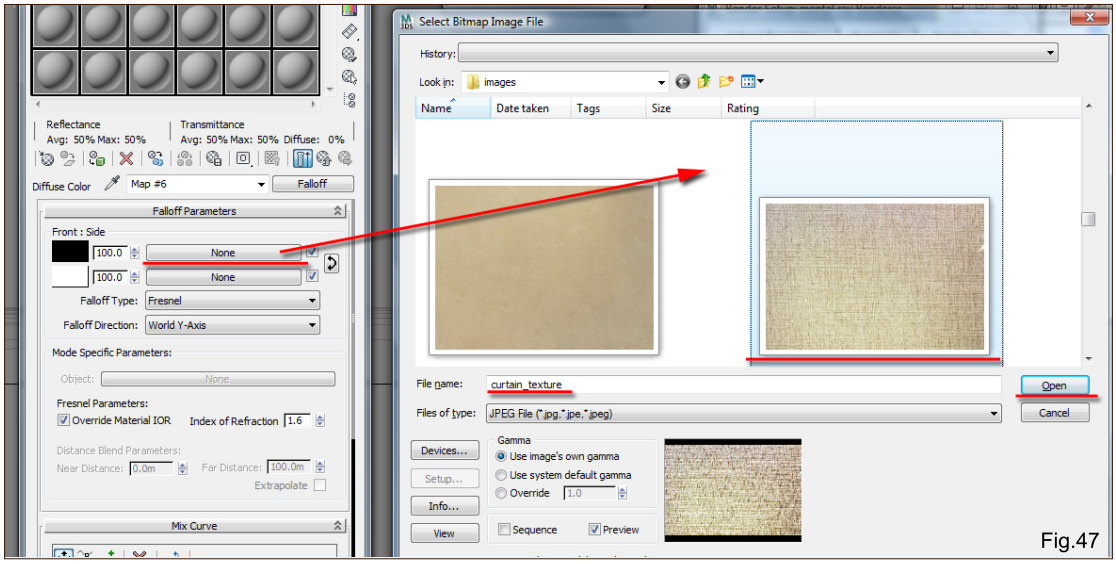
Fig.47

- Pan down to the Advanced Rendering Options rollout.
- Increase the FG /GI Multiplier value to about 2.0 (this will subsequently increase the brightness of the indirectly lit areas (shadow areas). Low values will produce opposite results.

Note that most of these values may be changed slightly when the lights are applied. Also, since this material is not fully transparent, enabling the "Transparency propagates Alpha channel" function will help capture refractions and other elements through the alpha channel (very useful for post effects in Photoshop etc) (**Fig.46**).

24 - Back in the Falloff parameters, one can apply a texture to the curtain by clicking on its toggle and choosing the relevant texture. To match the base Front/Side color swatches, simply increase or decrease the bitmap values in output amount or RGB level functions. Finally, apply the UVW Map modifier to its surface (**Fig.47 – 49**).

25 - The frame material resembles the copper shader. Select the picture frame object in the scene (i.e. object 4431_opened group) and apply the copper shader to it, with a few variations:

- The Diffuse Level value of the copper shader is very low by default (i.e. almost black). Increase it to about 0.7 to brighten it. Also, apply the AO shader to its Diffuse toggle, followed by copying and pasting its Diffuse Color swatch onto the AO bright color swatch!
- Its default reflectivity color is set to light orange. Change it to a much darker tone (**Fig.50**).
- Increase its Relative Intensity of Highlight value to about 5.0.
- In the Fast Glossy Interpolation, change it to "1(same as rendering)".
- In the Special Purpose Maps rollout, apply a nice bump texture to its toggle. Set the Bump value to about 0.7 and apply the UVW Map modifier. Then test render it!

Note that, once the lights are added some of these values may require changing slightly (**Fig 51 – 53**).

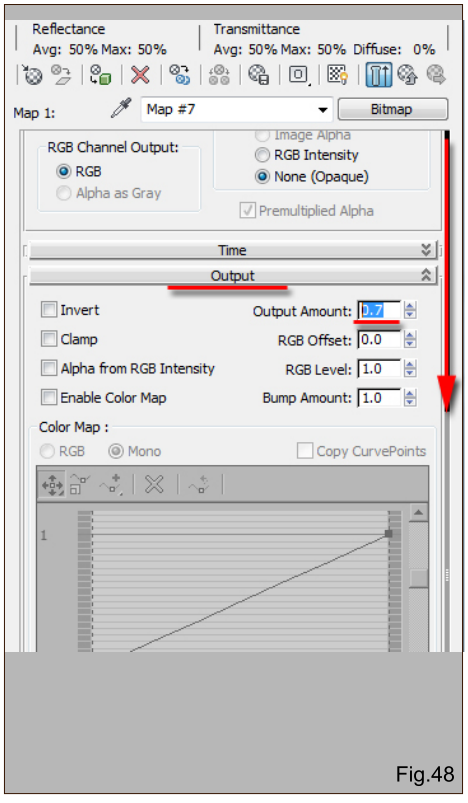
Fig.48

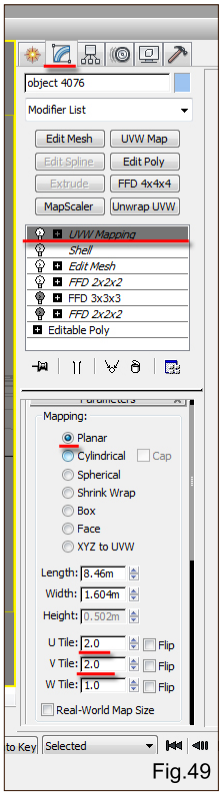
Fig.49

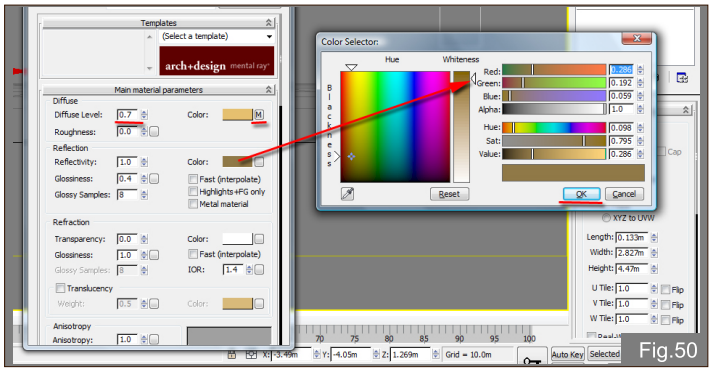
Fig.50

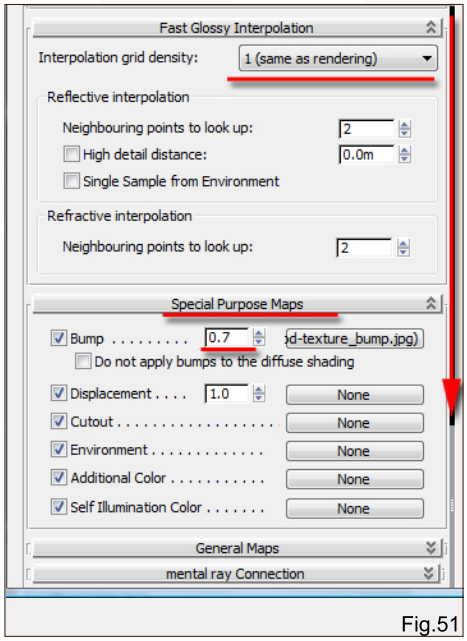

Fig.51

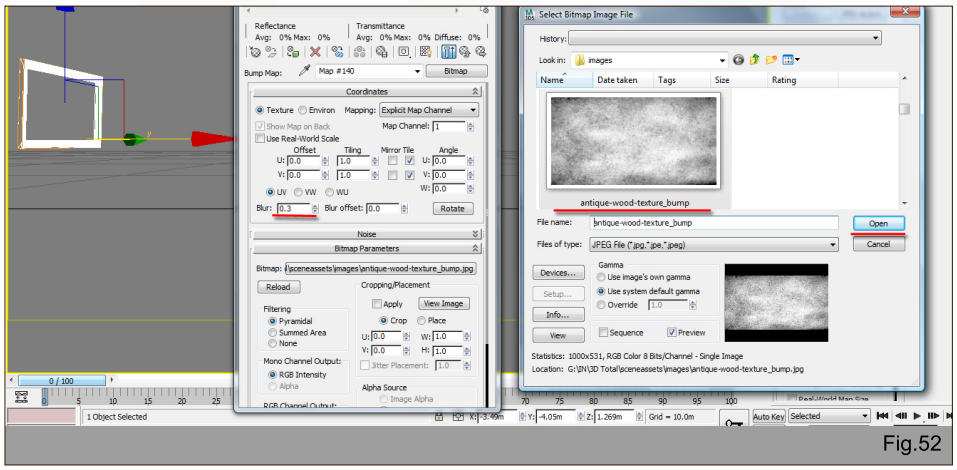
Fig.52

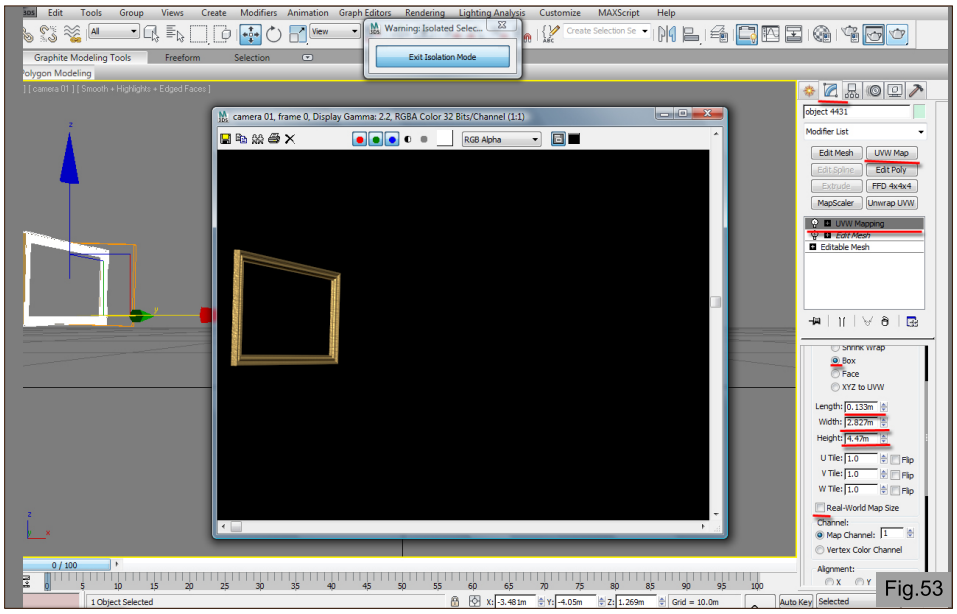
Fig.53

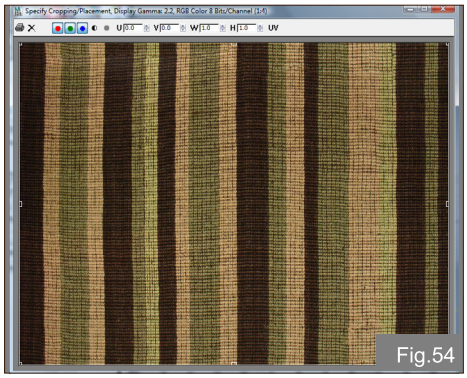
Fig.54

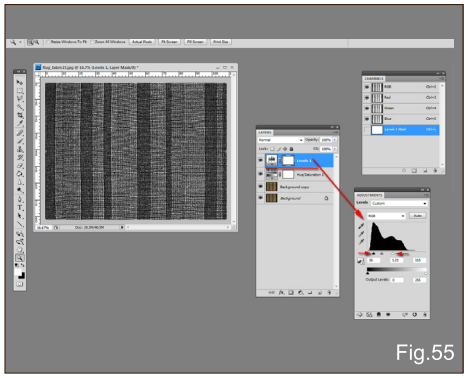
Fig.55

26 - The next material to focus on is the carpet.

From photo references one can see that, its surface is commonly of a non-reflective, thick and heavy wool fabric.

The next task is to bring out all these physical properties in mental ray and Max. Since the carpet makes up a big part of the scene composition, it will be equally important to choose a color and/or texture pattern that makes the scene more appealing.

The common practice is to source from photo references of colors/texture patterns that work best together!

27 - After thorough research, and mix/matching colors/textures, the following texture was chosen (**Fig.54**).

28 - A black and white version of the same texture was created for the Bump and/ or Displacement toggles, with help of Hue/Saturation and Levels in Photoshop (**Fig.55**).

29 - To begin addressing its physical properties, we are going to do the following:

- Apply a basic Pearl Finish shader with the chosen texture and AO applied to its Diffuse toggle as previously done.
Assign it to the object in the scene (named "object 2847").

- Disable the "Fast (interpolate)" function.
- Set its entire Reflection group values to 0.0 to eliminate any reflections and/or glossiness (**Fig.56**).

30 - Apply the black and white texture to its Displacement toggle and the UVW Map modifier to the object.

In its bitmap Coordinates, disable the Use Real-World Scale function, and set the Tiling to about 2.0. As mentioned earlier the correct texture tiling often contributes to the realism of the image (**Fig.57**).

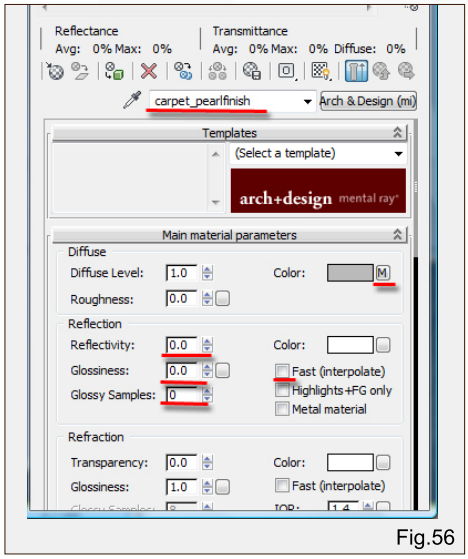

Fig.56

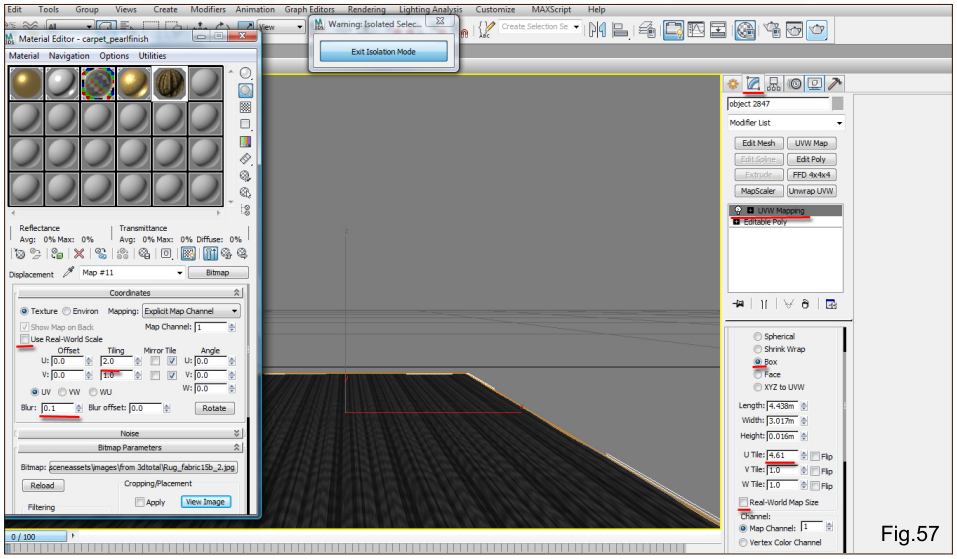

Fig.57

31 - In the Special Purpose Maps rollout, the Displacement value is usually set to 1.0 by default.

With the current unit scale (i.e. meters), this value will be equivalent to about one meter, which is a bit too high. Change it 0.01 and test render it! The value of 0.01 seems too high still, however, it will be tweaked further when the lights are applied.

32 - The next material to work on is the mirror.

Mirrors are often very simple to replicate, especially in mental ray. To apply this shader, simply select the object named “object 4455” in the scene (open the group).

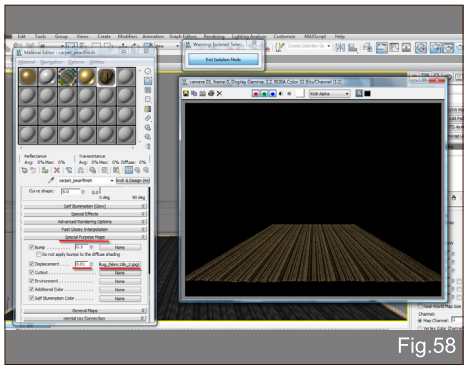
Fig.58

Select an empty material editor slot and apply the ProMaterials:Mirror shader from the Material/Map Browser dialog box list. Assign it to the relevant object. Its parameters are self explanatory.

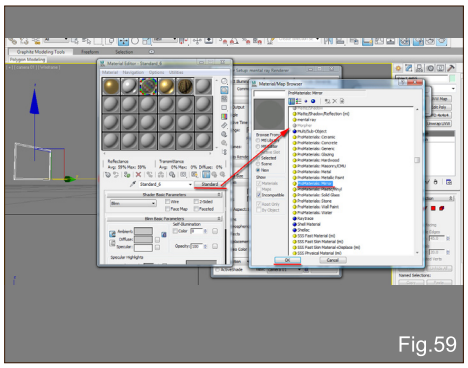
Fig.59

To change its greenish base color simply click on its Tint Color (Reflectance) swatch and change it (**Fig.58 – 60**).

33 - The next material to work on is the wooden floor. Most wooden floor materials are perceived to have a satin glossy finish to it, with rectangular floor tiles. Its basic texture is highly recognizable.

Mental ray has a selection of shaders dedicated to these types of surfaces: Arch & Design Satin/glossy varnished wood and the hardwood, masonry/CMU promaterial shaders.

But for this specific exercise, we are going to use the Pearl Finish shader, with a specific texture. The approach will be similar to the ones used earlier:

- Select the object named “object 4544” in the scene.

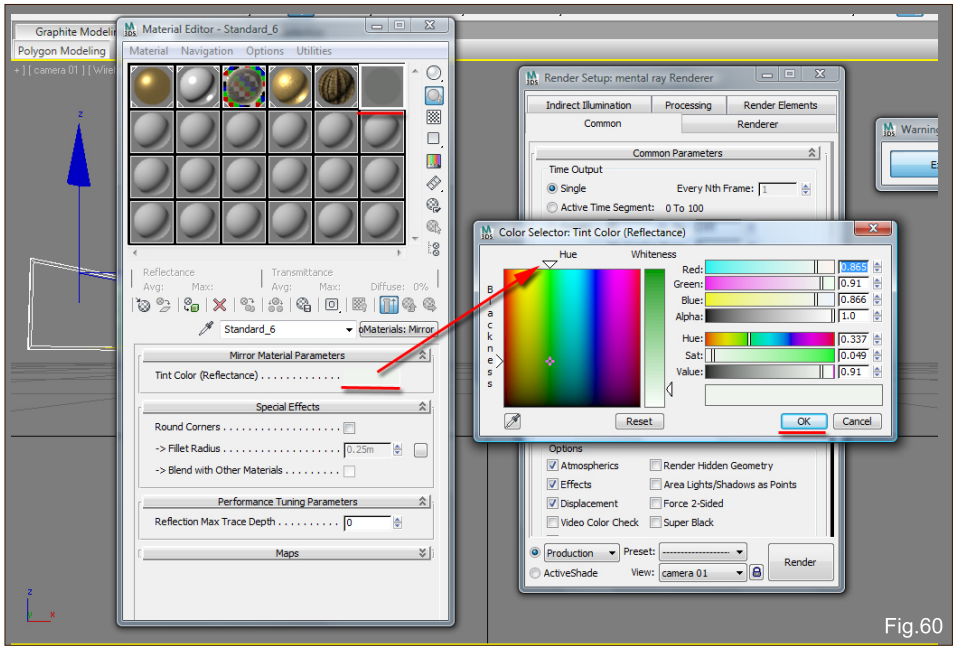

Fig.60

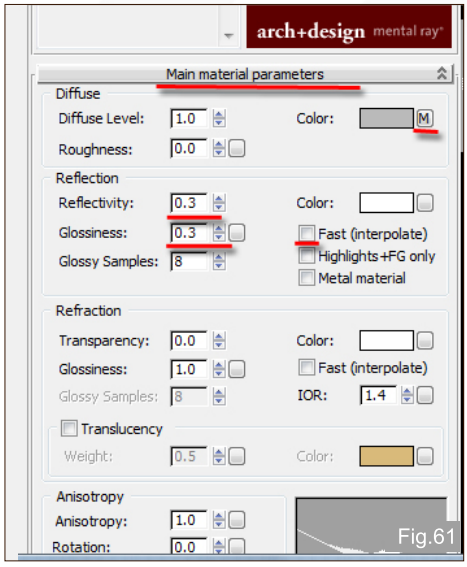

Fig.61

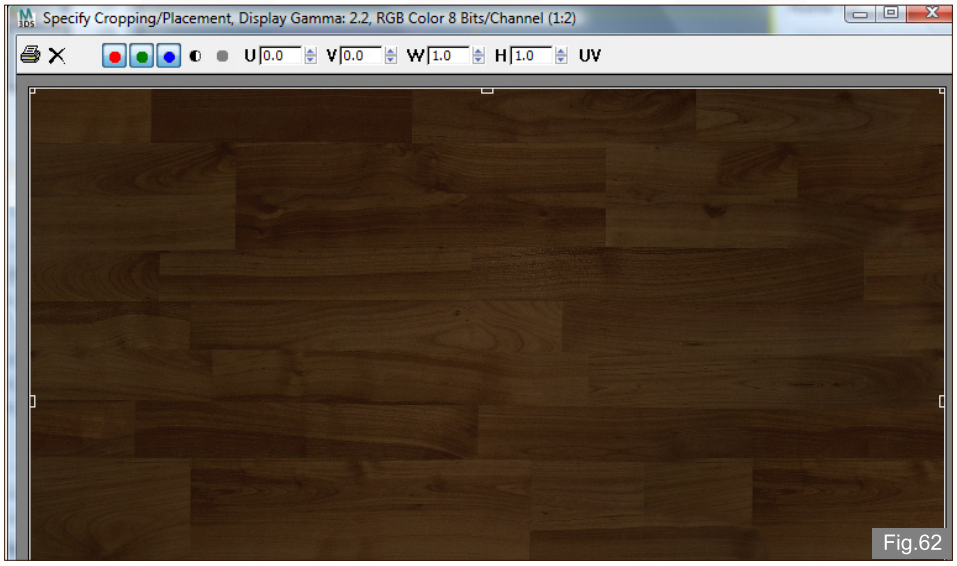

Fig.62

- Select an empty slot in the Material Editor and load up the Pearl Finish material template shader. Then assign it to the relevant object.
- Next, we are going to choose the texture/color that will complement the carpet. Assign it to its Diffuse Color and also use the AO.
- Add the Composite shader on top of it
- On the main material parameters reduce the reflectivity and glossiness values to about 0.3, to emulate the satin effect.
- Disable the “Fast (interpolate)” function and change the Fast Glossy Interpolation to “1(same as rendering)”.
- To control the glossiness appearance, we are going to increase the “0 deg. refl:” value to about 0.55 in the “BRDF” rollout, to spread out the glossy highlights.
- Create another black and white version of the main diffuse bitmap to be used as bump; and apply it to the Bump toggle. Note that most of these values will be tweaked later (**Fig.61 – 62**).

34 - A similar principal was applied to most of the wooden surfaces in the scene, with slight changes to their diffuse textures; glossiness/reflective values; bump texture source and values; different BRDF values; increased/decreased relative intensity values; varied round corners values; tweaked with some of its FG/GI multiplier values etc.

35 - For the handle of the chest of drawers, we are going to apply a nice brushed metal surface shader to it.

Choose the Brushed Metal from the Arch & Design shader template list.

Its default parameters are usually ok, however, if you want to add the AO to its Diffuse toggle, its toggle need enabling.

To do so, simply pan down to the General Maps rollout, and enable the Diffuse Color from the Main Maps group (**Fig.63 – 64**).

36 - When using this shader, it’s very important to apply a mapping modifier to the relevant object, as one may encounter “missing mapping coordinates” errors, when rendering.

This is mainly to do with the brushed metal grain procedural material, applied to its Reflection Color toggle, by default.
The next step is to make the material visible in the viewport and apply the UVW Map modifier.

- Enter the brushed metal grain parameters by clicking in the Reflection Color toggle.

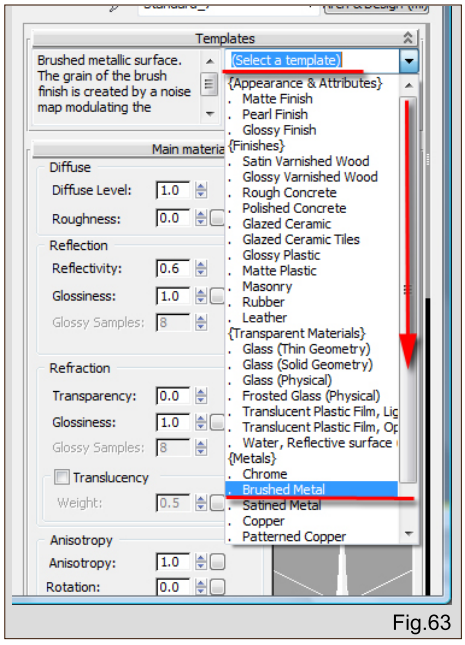

Fig.63

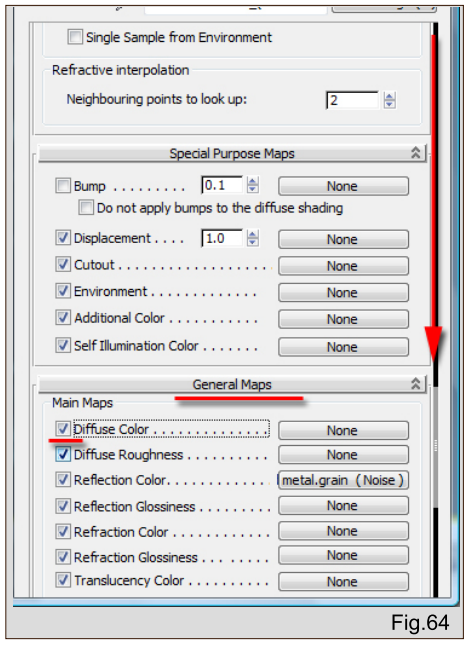

Fig.64

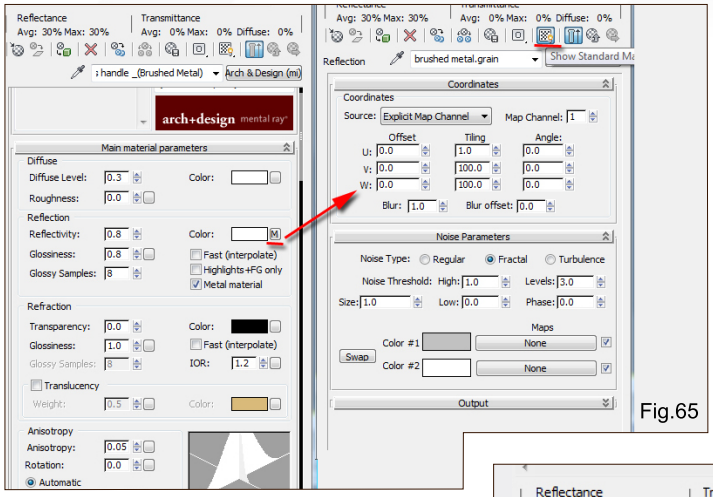
Fig.65

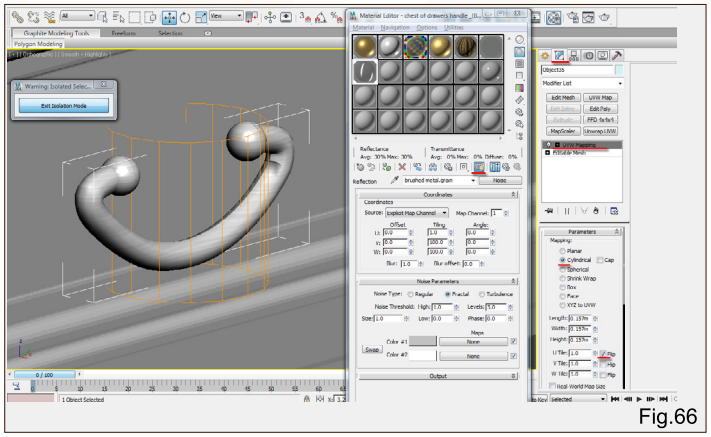
Fig.66

- Its parameters should open up. Click the Show Standard Material button to make it visible in the viewport (**Fig.65**).

37 - Add the UVW Map modifier to it. Choose the Cylindrical Mapping method and flip the U tile direction (**Fig.66**).

38 - Back in the main parameters, increase the Relative Intensity of Highlights to about 10.0.

39 - For the candle material, we are only applying a simple Translucent Plastic Film shader template from the list, to emulate the wax surface.

To make it more opaque, decrease its transparency values, as previously described! (See **Fig.67 – 68**).

40 - The Pearl Finish was used as the basic shader for the remaining objects in the scene, with different textures and bumps applied.

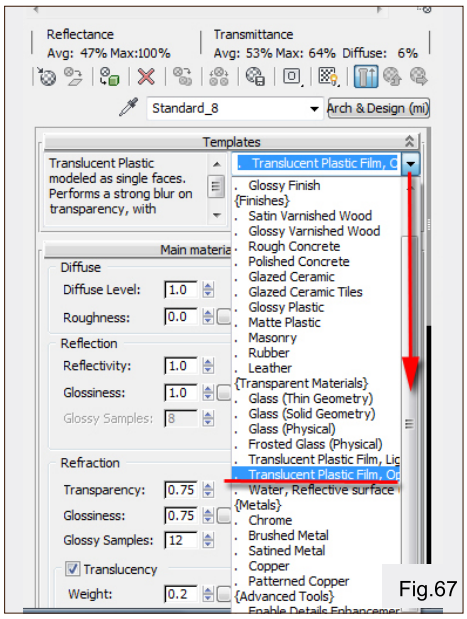
Fig.67

In addition, some of the previous settings/ functions discussed were used differently according to each object.

For example, the Falloff shader was used again with two different textures, for the basic diffuse toggle textures of the two main chairs in scene.

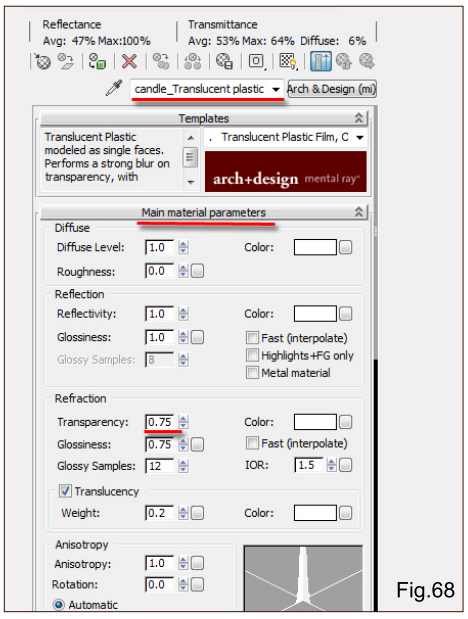
Fig.68

The wall was made up of a basic white Pearl Finish shader (**Fig.69**).


Fig.69

LIGHTING

As previously mentioned, lighting plays a unique and important role in bringing the scene to life. Therefore it is vital to take the necessary steps to plan and create the type of lighting that will appeal and complement your scene.

First, choose the appropriate lighting situation through photo references (i.e. interior; exterior; day; sunset; night etc).

The next step is to source more photo references of the chosen lighting situation that

resemble your 3D composition somehow. (Use a photo reference).

The majority of artists often go for contrasting scenes with long shadows (i.e. prominent bright and dark areas).

The color of the lights is also crucial when setting up the mood of the scene. For instance, professional artists tend to work mainly with blue and yellow hues as they are more appealing and complementary to each other.

For this scene, a cold blue color can be applied around the window areas to emulate the ambient light generated by the sky.

And a warm yellow color can be applied to the directly lit areas by the sunlight.

Moreover, in some cases one would also apply a very warm yellow light to the lamp shades to accentuate further the contrast between the two colors (i.e. blue and yellow).

Technical approach: It is common practice to first open the mental ray message window and set the direction of the Sun light, if existing in your scene.

The most quick and efficient approach to this is to enable the Hardware Shading tool first, and finally select and move around the daylight object in the viewport as desired.
Alternatively, to view the shadow directions in render, one can also switch off the Final Gather settings for a quick and draft rendering process, coupled with using a basic non-reflective/non-glossy mr shader, preferably of white color.

Finally set the Sampling quality to draft! The final quick test render should be a black and white image: black depicting the indirectly lit areas and white the directly lit areas.

The next step is to enable Final Gather. Set its parameters to Draft and begin adding lights as required.

One should do a test render every time a light is added and/or any of its parameters are changed. It is very important for the final image to have a clear contrast between bright and dark areas. This methodology will help one control the scene's overall depth, contrast and colors.

Once reasonably satisfied, disable the Material Override function and begin refining the lights, camera parameters (i.e. exposure etc), shaders, materials, etc.

Most camera parameters and shaders can be tweaked at a later stage once FG parameters have been saved, however, it is highly recommendable to have most of these parameters reasonably acceptable before saving the final gather parameters.

The final stage is to save up the Final Gather files, reuse them and finalize refining shaders, textures and the camera parameters.

In this exercise, we will be emulating broad daylight and as such, we will try to bring most elements that depict this time of the day. However, it may be necessary to exaggerate a few of these elements in order to make the most of the 3D scene. Some of these elements are the shadow length and/or directions, colors, brightness, contrast, etc. The final objective is to use any means necessary to positively maximize the impact of the final piece.
With all that said, open the Max scene, named "finished textures". It is worth noting that Render Sampling quality is set to draft at this stage.

Since all shaders and textures have been worked at, we will be concentrating mainly on the lights and the overall final refinements.

41 - Open the mental ray Messages dialog first, by selecting it from the Rendering dropdown list of the main tool bar. This dialog will help monitor the rendering progress, for any possible errors.

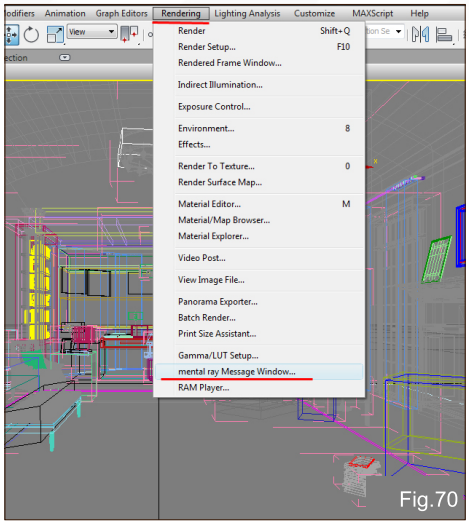

Fig.70

Finally, ensure to enable all its functions (i.e. information, progress, debug and open on error) (**Fig.70 – 71**).

42 - The first step is to create the Sun light and set its shadow direction, whilst keeping the rendering times to a minimum.

- Maximize the viewport display (Alt + W) to have better control over daylight creation.
- Create the daylight system by first clicking on the Create main tool bar.
- On the dropdown list, choose Lights, followed by Daylight System.
- You should be prompted by the Daylight System Creation dialog box. Accept it, followed by left clicking and dragging the cursor to start the creation.
- On releasing the mouse to complete the compass creation, the mental ray Sky dialog should appear. Accept it to continue the creation.
- Continue the creation by moving the cursor up or down to set the distance of the daylight object from the compass helper.

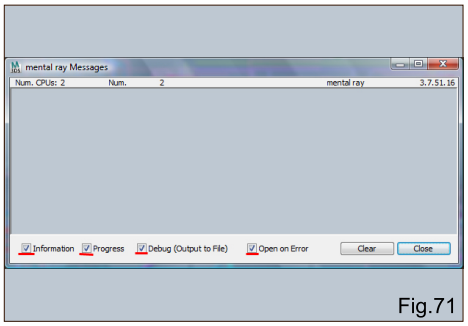

Fig.71

Once satisfied, simply left click to finish the creation. Click the Select and Move tool from the toolbar to complete and exit the creation (**Fig.72 – 74**).

Note that, the" mr exposure" and "mr sky" dialogs will not be prompted if both of these toggles are not empty.

43 - With the daylight system created, it is now time to set the shadow directions.

While the daylight object is selected, open the Modify command to ensure that the "mr sun" and "mr sky" are loaded in the daylight parameters.

By default, the daylight system's position is automatically set by the date, time and location function, which is accurate. However, for the purpose of this exercise we are going to change it to Manual type (**Fig.75**).

44 - Next we are going to enable the Hardware Shading by first right clicking on the viewport visual style tab. Then in the dropdown list, choose Lighting and Shadows, followed by the Enable Hardware Shading option. Alternatively you can press Shift + F3.

- Also, turn the viewport visual style to Smooth + Highlights mode (**Fig.76 – 77**).

45 - Right click on the viewport visual style again to configure the Lighting and Shadows settings.

- In its parameters, under Illuminate Scene With, enable the Scene Lights function. This function will allow us to see the shadow directions in the viewport, in real-time. One can enable other functions, if desired. Close it by clicking OK (**Fig.78 – 79**).

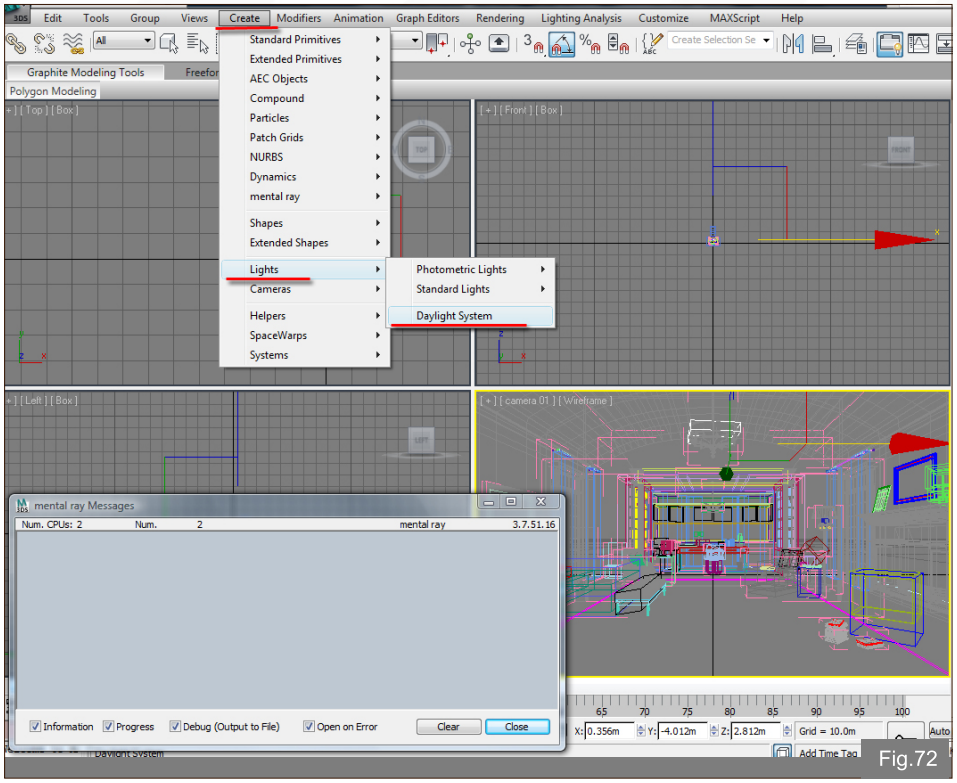

Fig.72

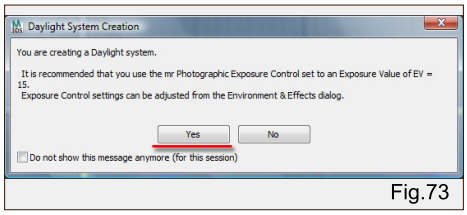

Fig.73

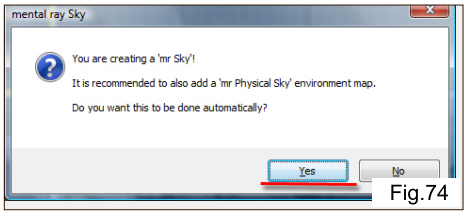

Fig.74

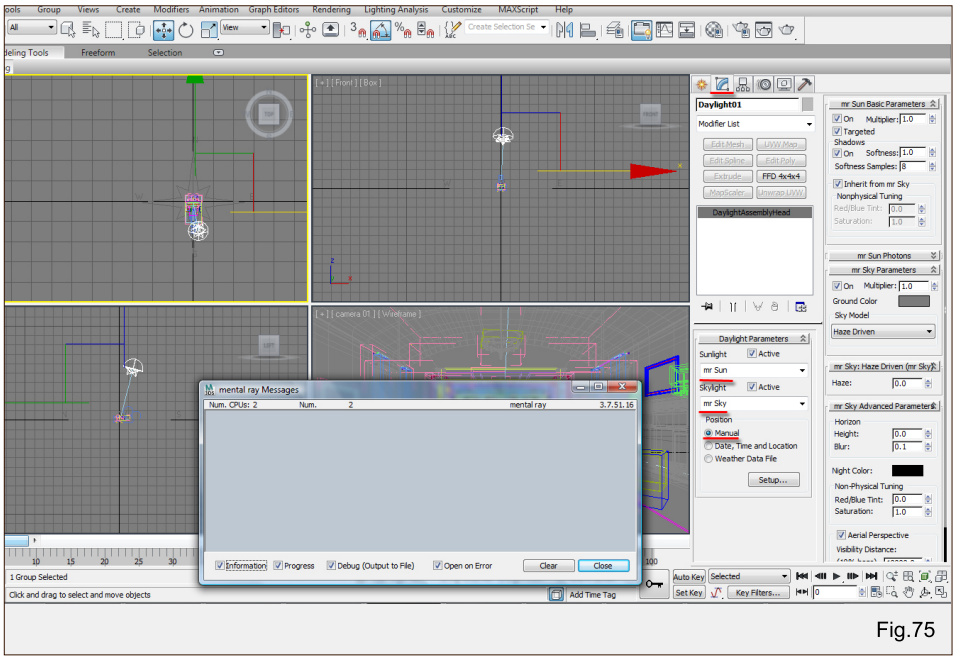

Fig.75

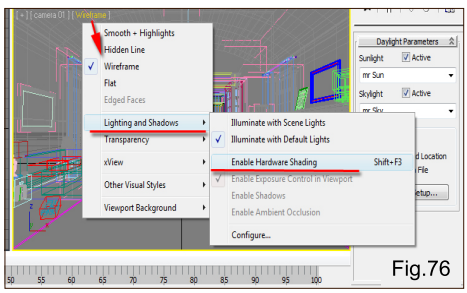

Fig.76

46 - The viewport display should change somewhat. The Enable Shadows function should also be checked.

If any of the objects receiving shadows are being displayed as boxes in the viewport, the shadows may not show correctly.

To prevent this, simply select the relevant objects, right click and choose the object Properties option from the list. Disable the Display as Box function, in the Display Properties group (**Fig.80 – 81**).

47 - Now is the time to select and move around the daylight system object, to choose the appropriate shadow direction.

Long shadows often help to add drama to the scene. Also, having bright Sun spots will help bring the scene to life. It's commendable to move the Sun to a position where one can maximize the number of objects casting shadows in the scene.

Shadows coming from the right-hand side of the room seem to cause more impact in this scene.

If you are experiencing difficulties with your graphics card when displaying shadows in the viewport, just disable it and turn to Wireframe visual style. One would have to rely on the quick test renders instead (**Fig.82**).

48 - For quick turnarounds, we are going to disable the Final Gather parameters since we are only interested in the shadow directions at this stage.

- Open the Render Setup dialog, by clicking on its icon toolbar, or by pressing F10.

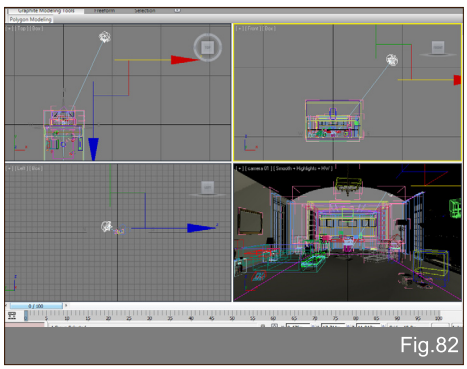
Fig.82

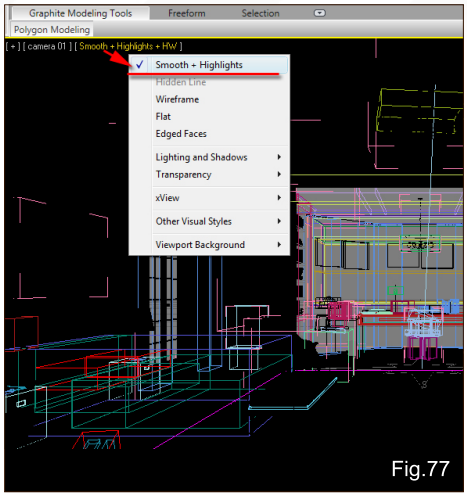

Fig.77

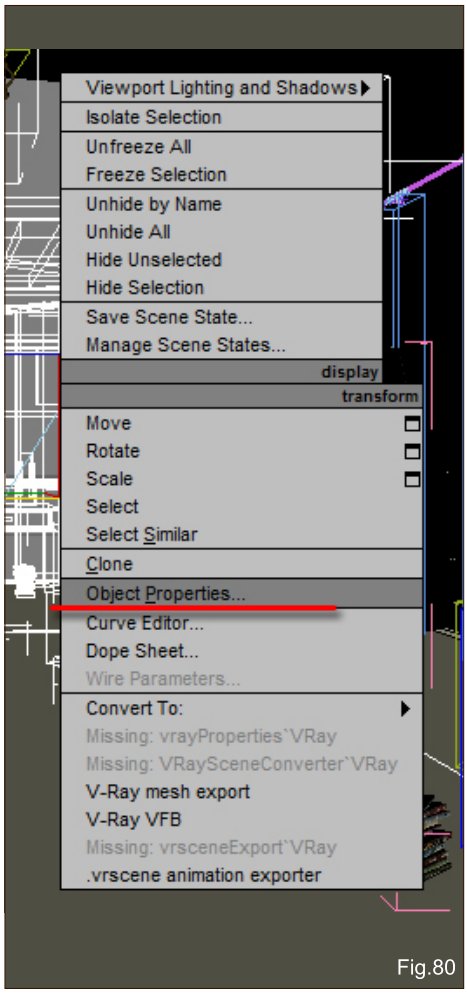

Fig.80

- In the Indirect Illumination parameters rollout, disable the basic FG parameters.
- In the Common parameters rollout, lock both image and pixel aspect; and set the output size to 500x234 (small). Also, lock the camera view (**Fig.83 – 84**).

49 - Moreover, we are going to set a non-reflective or glossy basic Pearl Finish

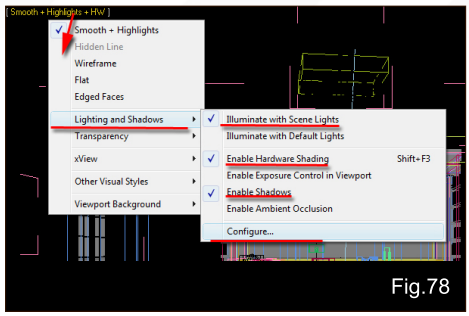

Fig.78

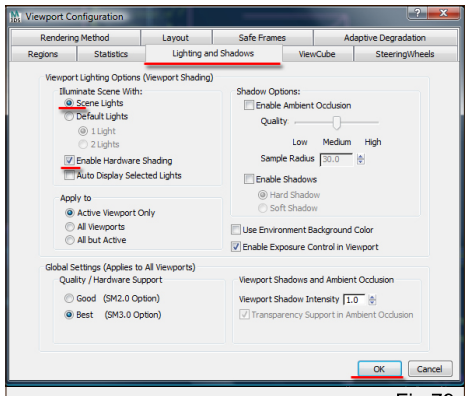

Fig.79

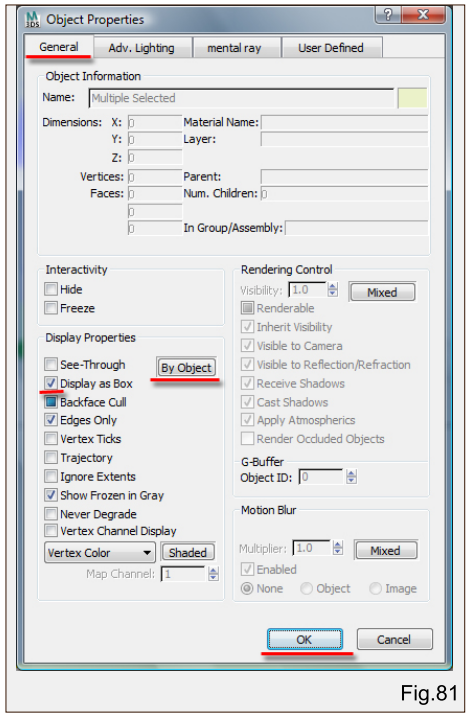

Fig.81

shader as the Material Override.

- Open the processing rollout and enable the Material Override.
- Next, open the Material Editor dialog (m); and select the basic Wall (Pearl Finish) (mi)_material from the slot.
- Drag and drop it onto the Material Override toggle, and choose Instance Copy, then click render (Shift + Q) to view the results.

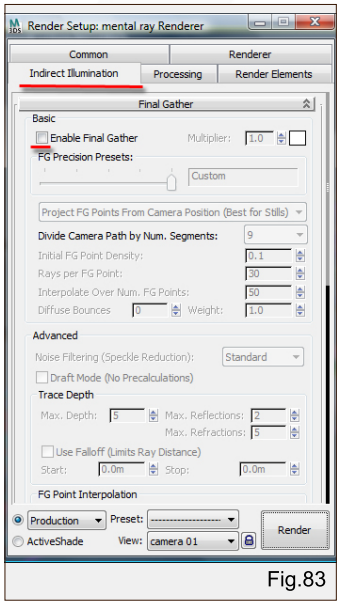

Fig.83

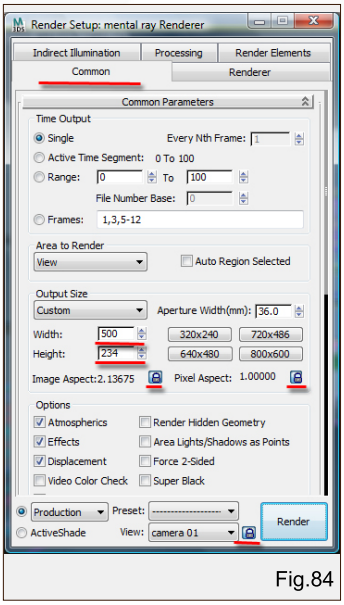

Fig.84

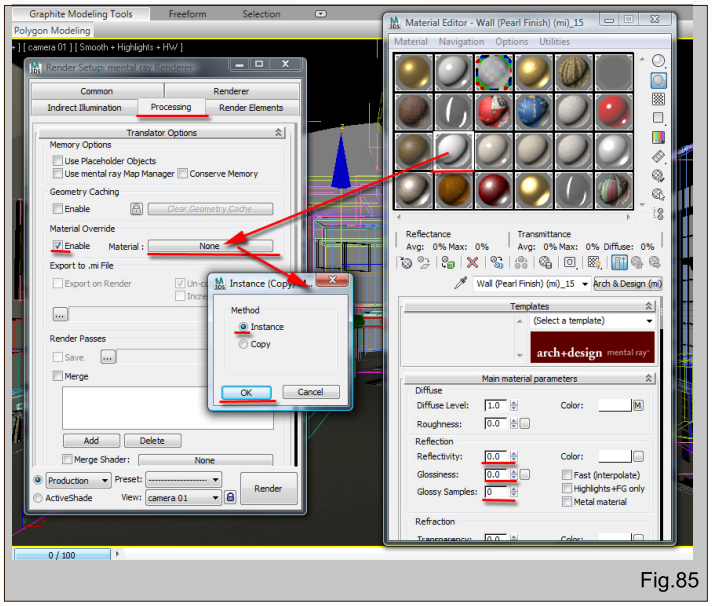

Fig.85

Click OK to any missing bitmap dialogs to continue (**Fig.85 – 86**).

50 - The shadows are looking ok, but they could much better.

Change the compass and daylight object position so it looks similar to the following image (**Fig.87 – 88**).

51 - Now that the shadows are looking nice, it's time to concentrate on the Sky Light parameters.

As mentioned earlier, the usage of blue colors around the window areas would add a really nice "feel" to the scene.

In real life this phenomenon is associated with diffused shadows generated by the sky color. As such, in Max the FG needs to be enabled in order to help emulate the color dispersion.

Then test render the scene with FG enabled. Although it is brighter, it's still pretty dark at this stage.

- Select the Daylight object and open the Modify command.
- In the "mr sky" parameters group, increase its Multiplier to about 3.0. Also, its horizon line needs moving down slightly; on the "mr sky" advanced parameters, decrease the Horizon Height to about -3.8. Then test render it again (**Fig.89**).

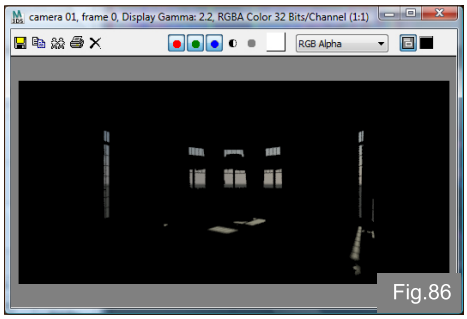

Fig.86

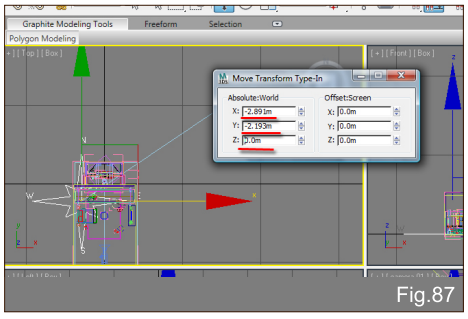

Fig.87

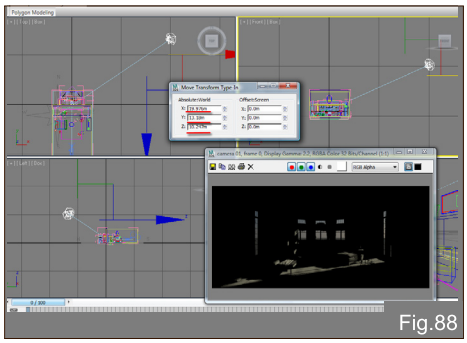
Fig.88

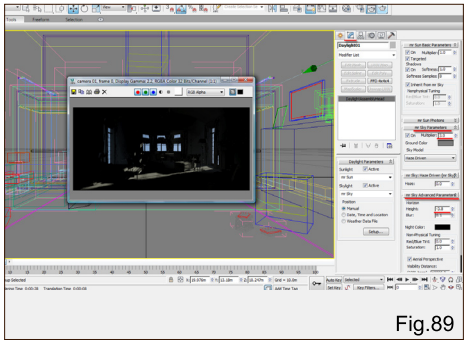
Fig.89

52 - Although slightly brighter with stronger blue tones, the image is still fairly dark.

Increasing the diffuse bounces should do the trick; coupled with increasing the "mr sky" multiplier.

- In the Render Setup, under Indirect Illumination, increase the Diffuse Bounces to 1.0. Note that higher values will result in a considerable increase in rendering time.
- Back in the Daylight "mr sky" parameters, increase its Multiplier to about 5.0. Then test render it again.
- Although much brighter now, the "mr sky" blue color could be accentuated further. To do this simply decrease the Red/Blue Tint values to about -0.4 (i.e. values of 0 and upwards are hues towards strong red; values of 0 and downwards are hues towards strong blue) and test render it.
- The blue looks much better now.

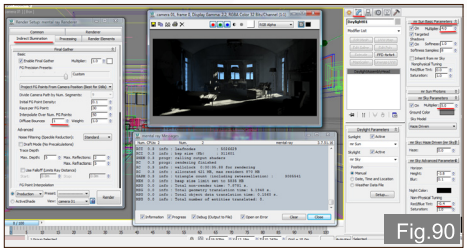
Fig.90

Areas brightly lit by the Sun often make an image more appealing (i.e. more contrast), as previously discussed. So it makes sense to increase the Sun's multiplier to about 4.0. Also, the direct sun is currently inheriting the "mr sky" color (i.e. strong blue); disable the "inherit from mr sky" function. The Direct Sun's color is now 0.0 (i.e. 0.0=yellowish). Then test render it (**Fig.90**).

53 - The brightness and colors have improved substantially, however, the foreground seems a bit too dark still. The next phase is to tweak with "mr photographic exposure" controls to correct the darkness in the foreground.

- Press 8 to open the Environment and Effects dialog.
- Enable the Process Background and Environment Maps function, to integrate everything with the exposure controls.
- Next, enable the Photographic Exposure function and choose the Physically Based Lighting, Indoor Daylight preset (**Fig.91**).
- Change the Physical Scale type to Unitless, and change its default value to about 1200.0. This function helps to integrate backgrounds/shaders more seemingly. Values of 90.000 and above are recommendable to help integrate background/environment components

Click on the render preview button, to see the results.

- It seems a bit too bright now, so change the shutter speed to about 90.0 (**Fig.92**).

54 - The brightness seems much better now. To bring out the white areas of the scene,

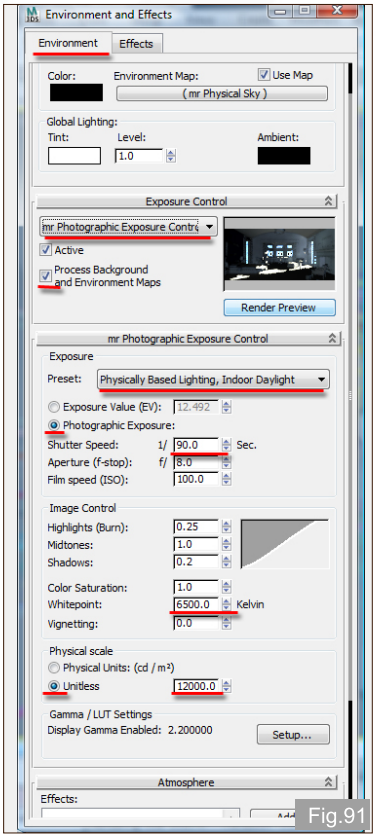

Fig.91

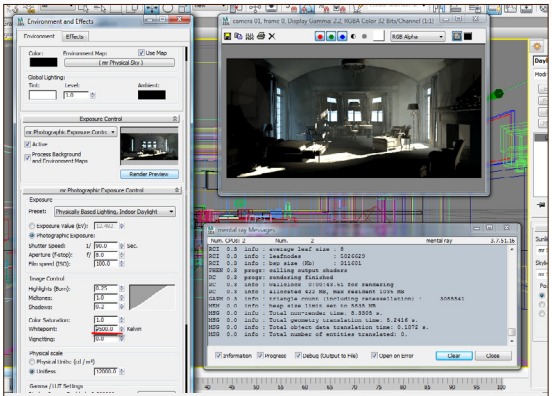
Fig.92

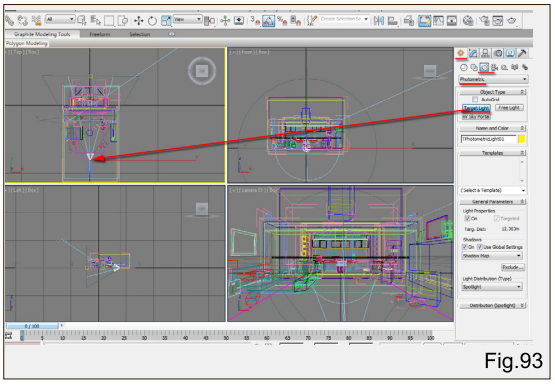
Fig.93

increase the Whitepoint value. The value of 9500.0 seems to have captured the white points of the scene much better. Test render again.

55 - The Daylight system; FG and the mr exposure controls have helped improve the brightness a great deal, however it is clear that more lights are needed to brighten the scene further.

First, we are going to add a Photometric light in the foreground to help balance the scene.
Select the top viewport. In the Create command, open the Photometric light set.

Click and drag the target light from the object type group to the front viewport, to create it (**Fig.93**).

56 - The idea is to create a nice diffused light to emulate light bounces around the designated area. The first step is to change some its default settings.

- Now that the light direction has been set, disable the Targeted function, in the general parameters. This is to provide more flexibility when moving the lights.
- Next, change the Shadows type to Ray Traced Shadows, in the shadows group dropdown list. Ray traced shadows work best with mental ray.
- In the Light Distribution (Type) group, change it from Spotlight to Uniform Diffuse for better distribution of light.
- In the Intensity type, change it to Dimming. This will help control the light intensity.
- Lastly, and most importantly, change the Emit light from (Shape) function from Point to Rectangle. Rectangle type is best to control the softness of the shadows (i.e. higher values of length/width = softer shadows.
- Select and move the light up, near the camera's height (i.e. 1.186m). Test render (**Fig.94**).

57 - The scene seems a bit dark still so increase its Dimming > Resulting Intensity values to about 1700.0 and test render (**Fig.95**).

58 - The scene is much brighter and balanced now. Increase the light's Length/Width Rectangle values, to diffuse the shadows further, if desired.

The next phase is to add Portal lights close to the windows, to emulate diffused shadows from the skylight.

Select the front viewport. In the Create command, open the Photometric light set. Click and drag the "mr sky portal" from the object type group to the front viewport, to create it (**Fig.96**).

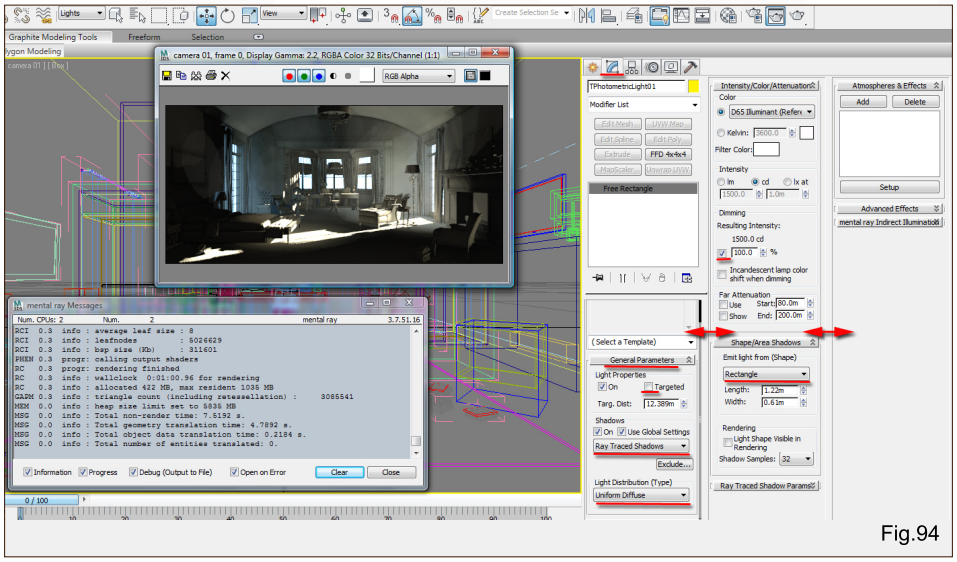
Fig.94

59 - The next step is to place this second "mr sky portal" light close to one of the windows (move+ rotate) and change some of its core parameters. Before you start selecting and moving lights, it's worth enabling the lights Selection Filter from the main toolbar, to facilitate light selections.

- Move/rotate and place the "mr sky portal" close to the left window.
- Increase its Width/Length dimensions to fit the window's size.
- Since this "mr sky portal" is being created to emulate the shadows, decrease its Multiplier value to about 0.5.
- Also, change its Filter color to match the skylight.
- Enable the Use Existing Skylight function, to closely match the skylight color.
- Change the shadow samples to 32, to reduce the noise/speckles caused by its shadows in the scene (note that the value of 32 will increase the rendering time slightly however, since the sky portal multiplier value is low, it may balance things).
- Copy Instance the "mr sky portal" from the left window, to the right window.
- Finally, just copy and move the third and last "mr sky portal". Place it behind the front window and match its dimensions. The renders should now look much better (**Fig.97 – 98**).

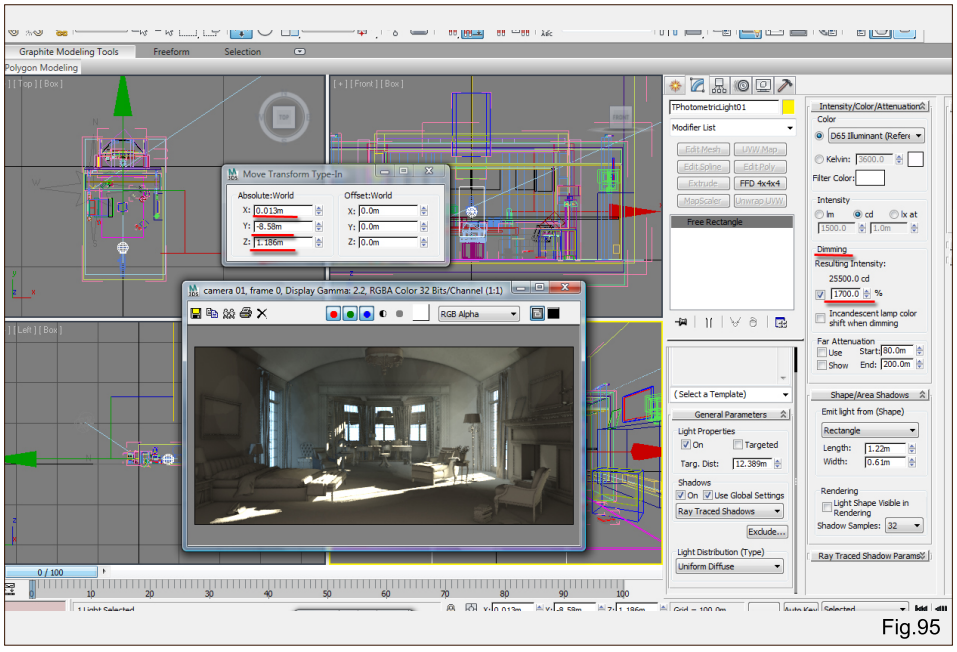
Fig.95

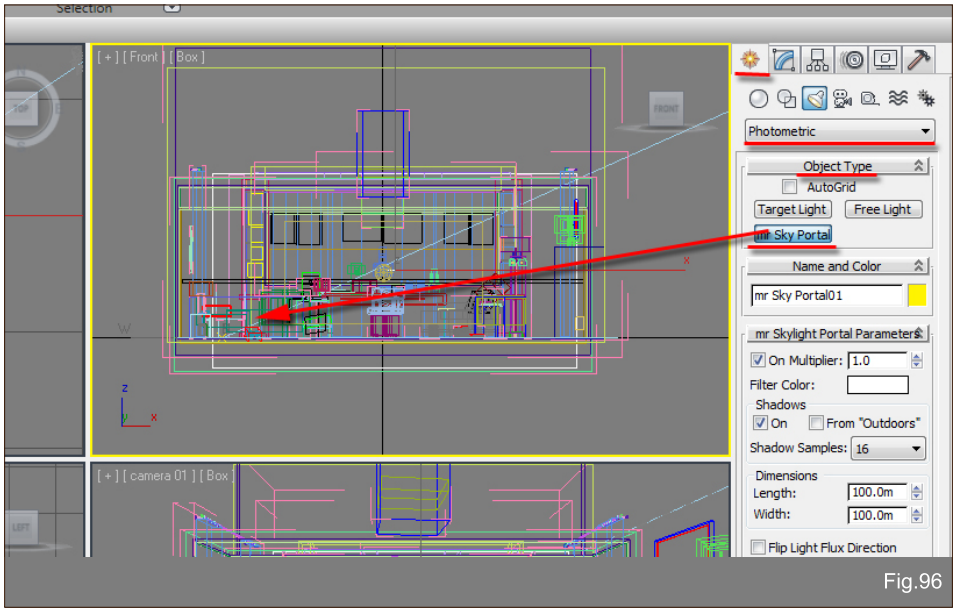

Fig.96

60 - After test rendering the latest changes, we can now begin fine-tuning the shaders/ textures etc.

Prior to that, we are going to try our first rendering using FG, without the Material Override (**Fig.99**)!

61 - The render seems to be coming together quite well, however, the image sampling quality is causing the render to look a bit speckled. This issue will be addressed later.

Next, we are going to add a nice background image to the environment and utilize its pixels to contribute to the Global Illumination, with the Environment/ Background Switcher (mi).

- Open the Material Editor dialog (M) and the Environment and Effects dialog (8).
- Open the Environment Map toggle and choose the Environment/Background Switcher (mi) shader from the Material/Map Browser list.
- To view its parameters, drag and drop it onto the Material Editor slot, by choosing the Instance method.
- This shader comprises of two toggles, Background and Environment/Reflections:
  - **The Background toggle** component will be used mainly for image display

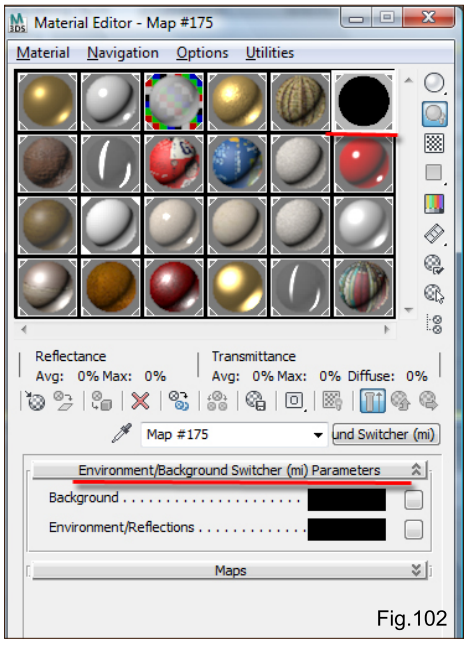

Fig.102

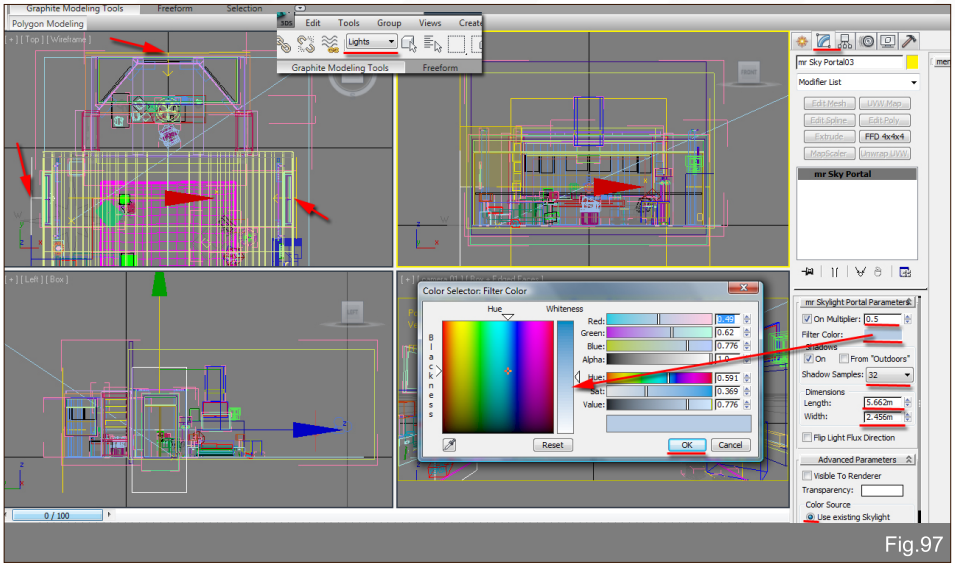

Fig.97

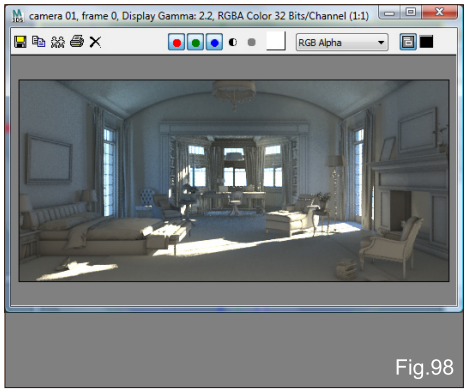

Fig.98

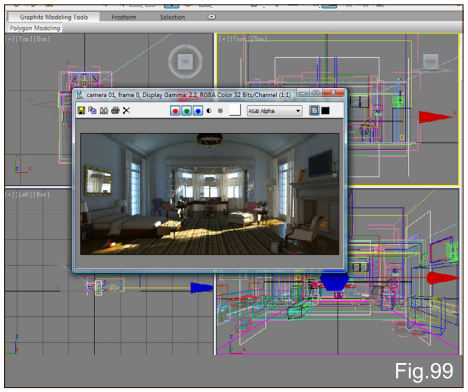
Fig.99

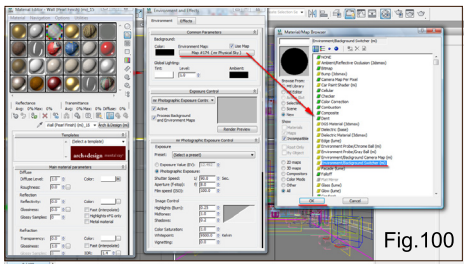
Fig.100

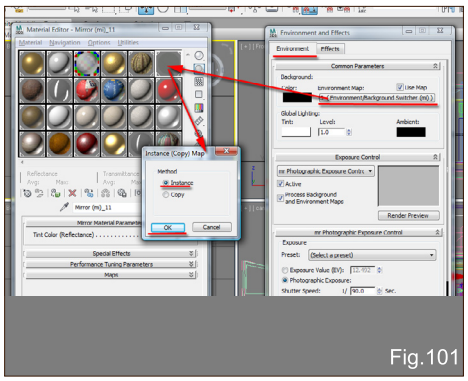
Fig.101

purposes. This toggle accepts most image extensions (i.e. Tiff,TGA;IBL;HDRI; JPEG;BMP; etc) and some shaders.

- **The Environment/Reflections toggle**, in conjunction with Environment Probe/ Chrome Ball (mi), will be used mainly for reflections. This toggle supports most image extensions (i.e. Tiff,TGA;IBL;HDRI; JPEG;BMP; etc) and some shaders (**Fig.100 – 102**).

62 - After a thorough search to find the appropriate image to suit this camera view and lighting situation, an image was chosen. Photoshop was also used to help integrate the image (i.e. with Levels/curves, etc).

63 - For fast rendering results, we are going to enable again the Material Override function, and isolate the front window frame areas, to help centralise the background map.

- Select and isolate some of the key front window areas.
- In the Environment/Background Switcher

(mi) parameters click and load the relevant image in the Background toggle (**Fig.103**).

64 - Its bitmap parameters should load up with default coordinates set to Environment type. Do a test render.

The horizon line of the background image seems to be lower than the window, and the bitmap scale doesn't seem to match.

- First, decrease the Blur value to 0.01, to sharpen the image.
- Change the Coordinates from Environment to Texture type, in order to be able to uncheck the Use Real-World Scale function, for better control of the tiling.
- With the Use Real-World Scale function unchecked, change the coordinates back to Environment type.
- Tweak its width/height offset position to have the horizon line in the centre of the window. Also, correct its size values to match the window areas and test render it (**Fig.104 – 105**).

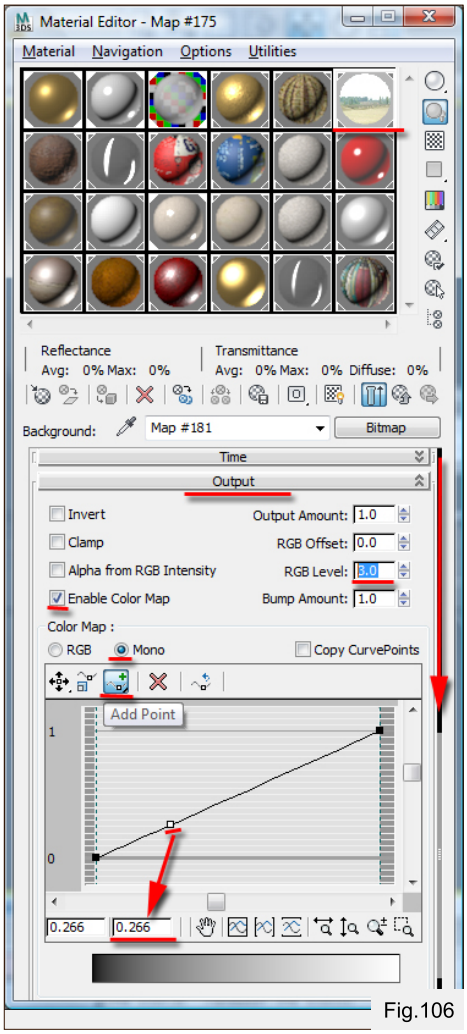

Fig.106

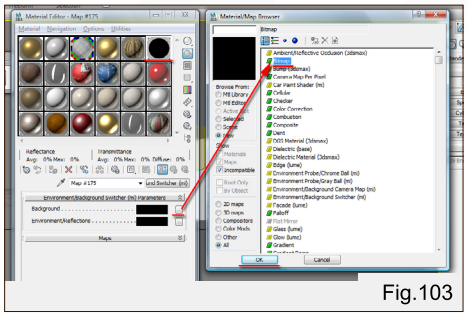
Fig.103

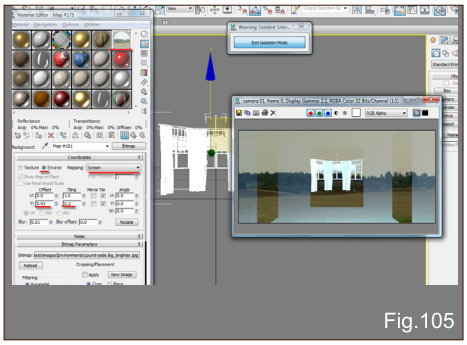
Fig.105

65 - The bitmap scale and its position seem to be better now. The next step is to brighten up the background image to emulate the exposure often generated by the camera. Note that, this effect could alternatively been achieved in Photoshop however, we are just highlighting the method of achieving similar results in Max/mental ray.

- To start the process of brightening up the bitmap, pan down to the Output rollout, increase the RGB level to about 3.0 and test render it.
- It's much brighter now, however, its brightness is slightly evened. The next step is to brighten up the upper areas of the image with the curve points, whilst retaining the existing brightness of the lower areas. First, check the Enable Color Map function.
- Next, click the Add Point button and begin adding and moving points as appropriate.

While the points are being added, it is worth keeping an eye out for the subtle changes taking effect on the relevant Material Editor slot (**Fig.106 – 107**).

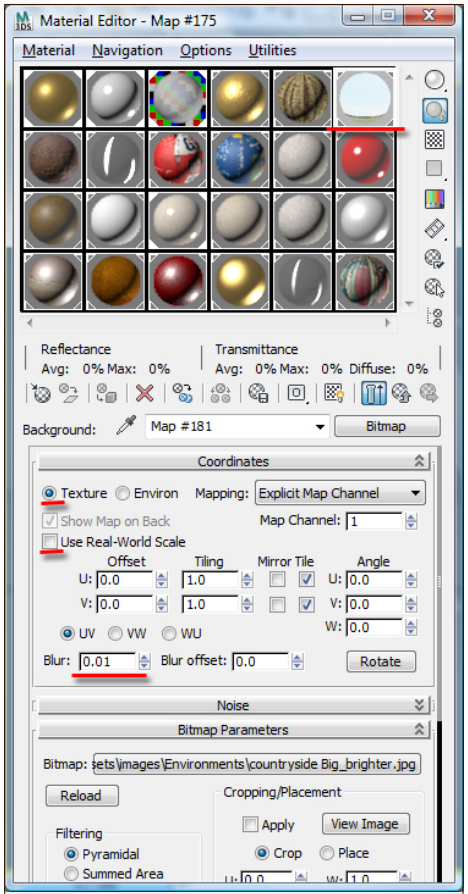

Fig.104

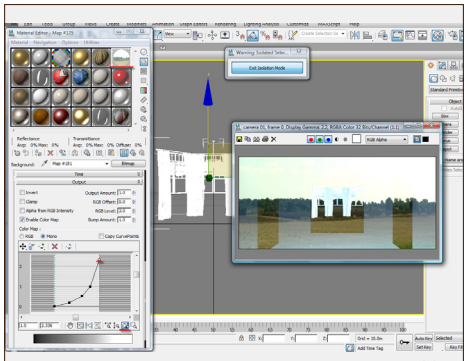
Fig.107

66 - The overall brightness looks much better now. Exit Isolation mode and test render the results.

Next, we are going to use the Environment/ Reflections toggle, in conjunction with Environment Probe/Chrome Ball (mi) for reflections (**Fig.108**).

67 - Back in the Material Editor, click on the Environment/Reflections toggle and choose the Environment Probe/Chrome Ball (mi) from the Material/Map Browser

dialog list. Its parameters should load up. One should concentrate on the following parameters mainly:

• **Chrome/Mirror toggle**; it enables users to load up the appropriate file formats (i.e. IBL; HDRI;JPEG;TIFF;BMP; etc). The image pixels are automatically used with FG solution.

Its FG functionalities are more visible with high dynamic range images (i.e.HDRI; IBL; mr physical sky; etc) and when the skylight head of the Daylight system is disabled.

In addition, a separate skylight object needs to be created with the Use Scene Environment function enabled. Alternatively, if the user is interested in the reflections mainly, then the original "mr physical sky" map of the environment toggle could be used in conjunction with an image file.

Also one can use the Use Custom Background function from the "mr physical sky" map parameters, for background image display purposes only.

Mental ray provides users with multiple choices.

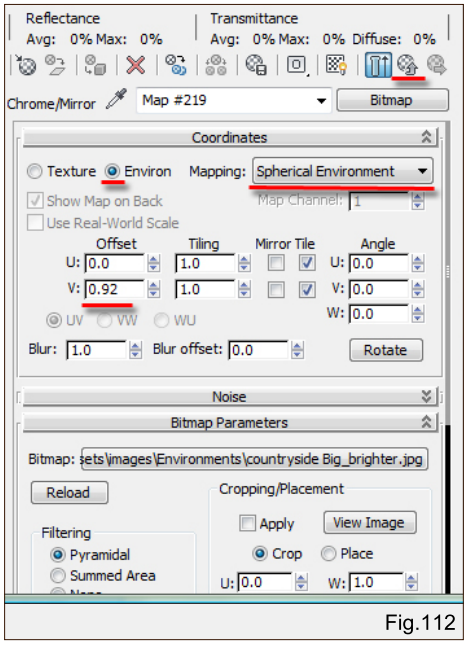

Fig.112

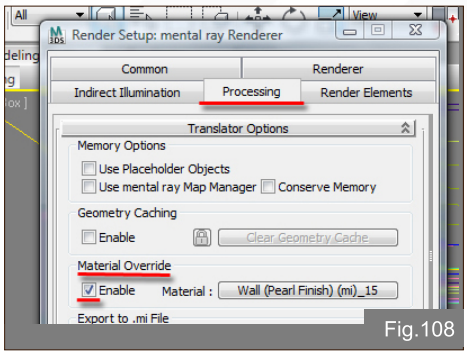

Fig.108

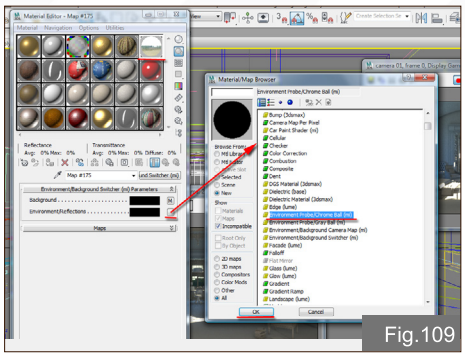
Fig.109

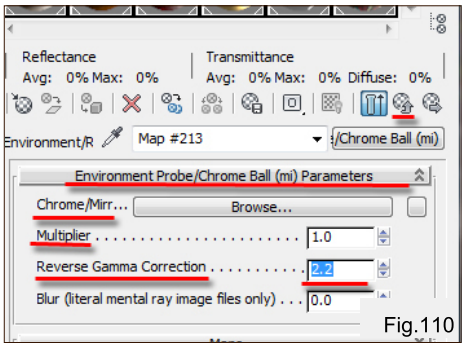

Fig.110

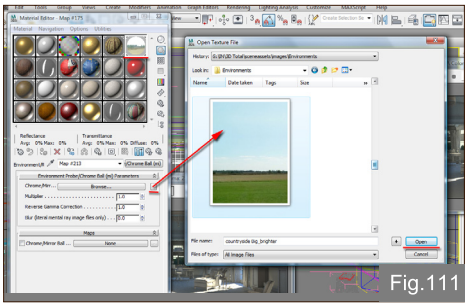
Fig.111

• **Multiplier**; it sets the intensity (i.e. brightness of the reflections and FG contribution of the image/shader. Default 1.0. Note that higher values may result in artifact reflections, depending on the image being used.

• **Reverse gamma correction**; it enables users to set the correct gamma values of the image being used. The default is 1.0, set it to 2.2 (**Fig.109 – 110**).

68 - The next step is to apply the appropriate file to the Chrome/Mirror toggle.

For best results one should use high dynamic range images etc, however for the purpose of this exercise we will be using the same JPEG as previously used.

- Click on the adjacent toggle to source the relevant file.
- Choose the bitmap type, from the Material/ Map Browser" list, followed by selecting the image.
- Disable the Use Real-World Scale function and set the mapping type to spherical; as previously done.
- Finally, change the V offset value to 0.92 (i.e. similar to the environment). These changes will be more apparent with the Material Override disabled (**Fig.111 – 112**).

69 - We are now at the stage where we should begin considering tweaking the shaders and textures.

As previously seen, when rendering, the process of computing the final gather, shaders and textures is often time consuming, even with the fastest computers.

So far, we have been successful in reducing most of this rendering time by using a basic Material Override shader, to quickly set up the lights and other parameters.

As one is gearing up towards rendering the full scene with shaders/textures, we need to pre-save the Final Gather solution without the Material Override function, to help reduce the rendering times.

To do that, there is one vital element that requires finalising first: Lights

- Disable the Material Override function and render the scene.

- The overall lighting seems to be reacting well with shaders and textures, although one may tweak it further, if desired.

70 - The next phase is to save the Final Gather file and reuse it to render only.

With the FG saved, mental ray will bypass the FG process and concentrate mainly on rendering. This will subsequently reduce the rendering times dramatically. It is highly commended to use one computer only, when executing this task.

Once saved, one can then use multiple computers to reuse the pre-saved FG file to render the image.

Mental ray is very powerful and efficient in enabling users to save the FG file at a small output resolution (i.e. 320x240), and later reuse for your final high resolution (i.e. 5000x3750), without artifacts.

Note that the camera view, image and pixel aspect output size need to be locked beforehand.

Moreover, when network rendering, it's vital to have this pre-saved FG file in a location where other computers can "see" it and reuse it.

71 - With the camera view, image and pixel aspect output size locked, we can now begin setting up the final FG parameters.

- On Render Setup dialog, under the Indirect Illumination rollout, increase the Initial FG Point Density value to about 0.7. This parameter is very useful to add depth to the scene and help correct most lighting artifacts. A value of 0.7 seemed sufficient, however one may tweak these values if desired.

Note that, higher values will result in higher FG processing time. Default 0.1.

- Increase the Rays per FG point to 150. The value of 150 is often the minimum required to achieve a nice and smooth interior lighting however, one may tweak these values as desired.

This parameter helps to improve FG accuracy by shooting rays in the scene. Higher values equate to better results however, the FG processing time will increase. Default 30.

- The Interpolate Over Num. FG points is very useful to correct most FG artifacts. However; very high values will result in less depth in the scene. Increase the value to 80. Note that, although very useful and effective, this parameter has little or no impact in the rendering time.

The value of 0 enables the mental ray Brute Force rendering essentially renders the scene without the FG pre process (i.e. raw). This will subsequently increase the rendering times dramatically.

On the Processing rollout, enable the Geometry Caching function. When enabled, this function caches the scenes geometry every time a render occurs.

For faster render translations; simply lock it to bypass this process. One should only lock it when all geometry changes have been addressed.

To delete any previously cached files, simply click the "clear geometry cached" button, and unlock it. Default 50.0 (**Fig.113 – 114**).

72 - With the above parameters set, it's now time to set mental ray to cache the FG maps.

- Back on the Indirect Illumination rollout, pan down to the Reuse (FG and GI Disk Caching) rollout.
- Change the Final Gather Map type to

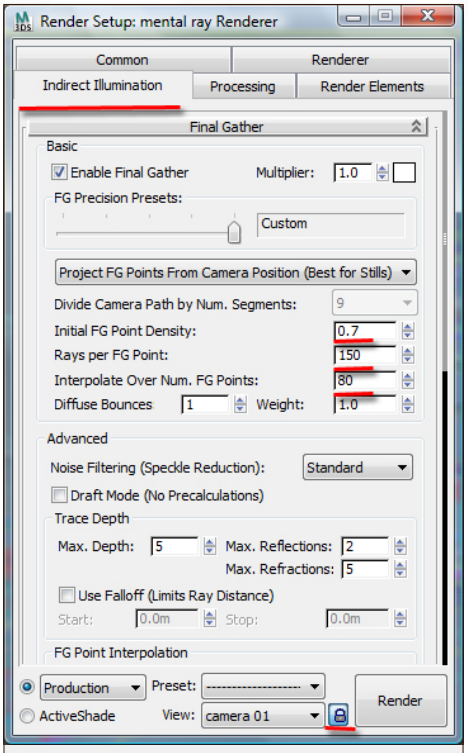

Fig.113

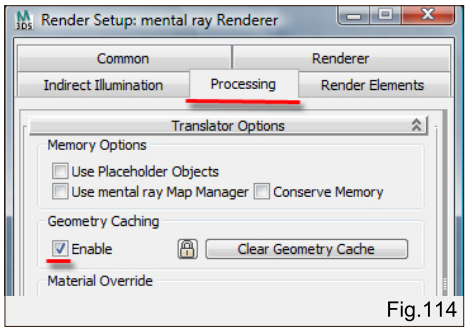

Fig.114

Incrementally Add FG Points to Map Files. This function will calculate and save all the final gather points.

- Click on the File toggle (i.e. ...), to set the name and destination of the saved FG file. Save it in the network, preferably as mentioned earlier. The adjacent button (X) enables the user to delete any existing file in the written destination.
- Since we know the overall result of the render, it's wise to enable the Calculate FG/GI and Skip Final Rendering function, if desired. This function forces mental ray to compute the FG process only, skipping the rendering.
- Finally, click the Generate Final Gather Map File Now, to render. Or alternatively pres Shift + Q (**Fig.115 and 116**).

73 - Once the rendering process is finished, change the Final Gather Map type to Read FG Points Only From Existing Map Files. This will freeze and reuse the FG map.

- Also, lock/freeze the cashed geometry from Geometry Caching function (**Fig.117**).

74 - The next phase is the final stage, which consists of fine-tuning the existing shaders to react to the lights, as desired, and adjusting the overall parameters (except FG and lights).

- On the last rendered frame window, click on the toggle UI to open it.
- Click on the Region selection window. Reduce its size and move it close to the bed side; between the carpet and wooden floor.
- Next, open the Render Setup dialog and change the output size to about 1000x468 pixels (**Fig.118**).

75 - The displacement of the carpet seems a bit too much. Moreover, the base of the bed seems to lack brightness and glossiness.

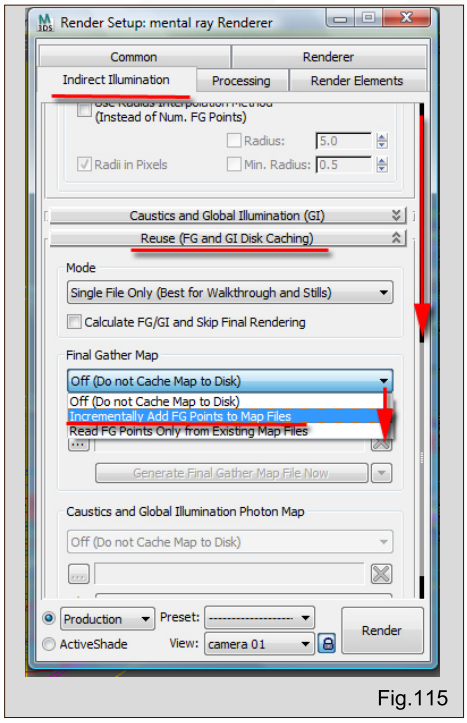

Fig.115

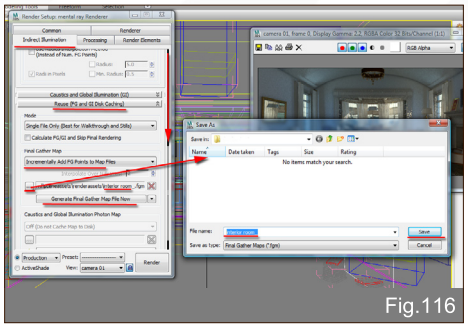
Fig.116

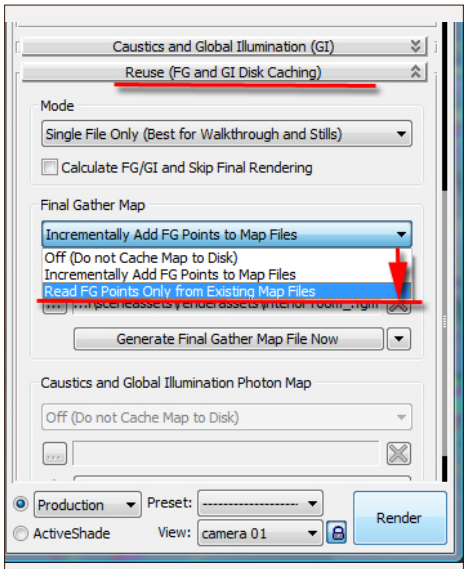

Fig.117

- Select the carpet object in the scene. In the Material Editor dialog, select an empty slot.
- Open the Material/Map Browser dialog by clicking on the Get Material button, to select and load it in Material Editor.
- Once loaded, decrease the Displacement value to about 0.008.

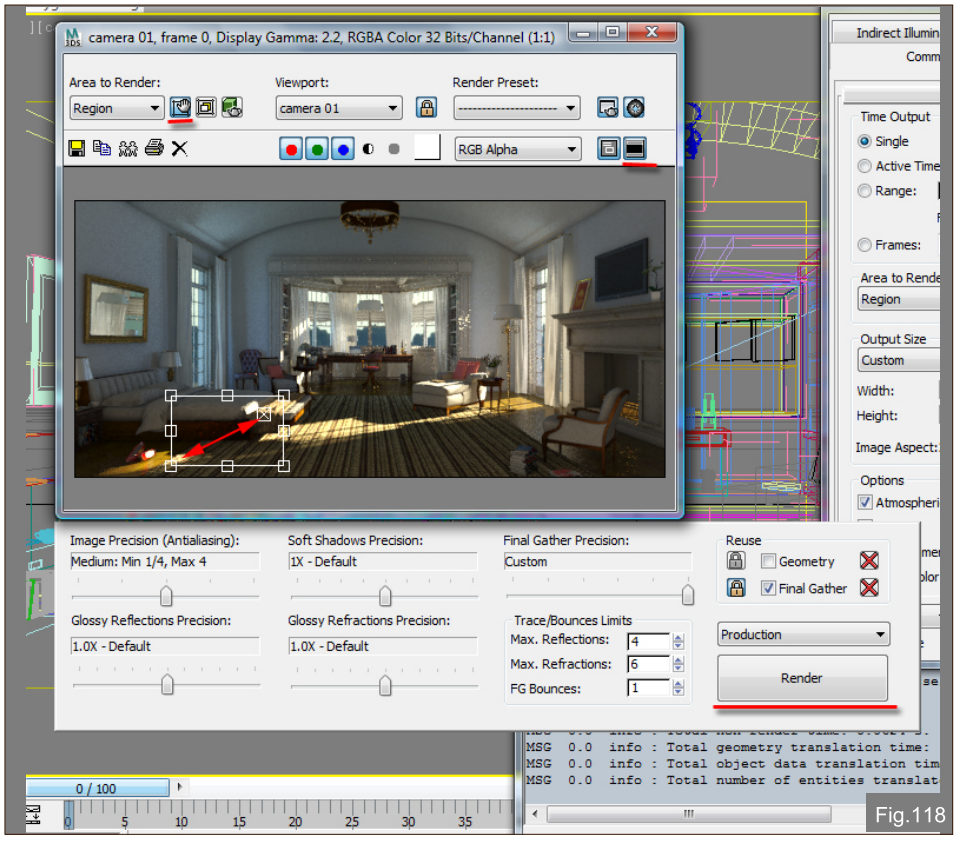

Fig.118

- Load up the base of the bed material, in the Material Editor, as previously done.
- Pan down to the Advanced Rendering Options rollout. In the Advanced Reflectivity Options group, increase the Relative Intensity of Highlights to 3.0. This function will boost up the existing glossiness highlights.
- To increase the brightness of the indirectly lit areas of the bed, increase the FG/GI Multiplier values to 2.0 (**Fig.119 – 120**).

76 - To have an accurate representation of the glossiness and the final quality of the render, we need to increase the Global Tuning parameters and the Sampling Quality.

- In the Render setup dialog, open the Renderer rollout.
- In the Global Tuning parameters increase the Glossy Reflections Precision (Multiplier) to 4.5. This function increases the

global accuracy representation of glossy reflections.

- In the Sampling Quality rollout set the minimum samples per pixel to 1 and the maximum to 16. This final value reduces the amount of noise and jagged edges in the render (i.e. better quality); however, it will increase the rendering times slightly.

It is not recommended to use maximum values higher than 16, especially when the final rendering size is 3000 pixels or higher. Higher values will increase the rendering times dramatically.

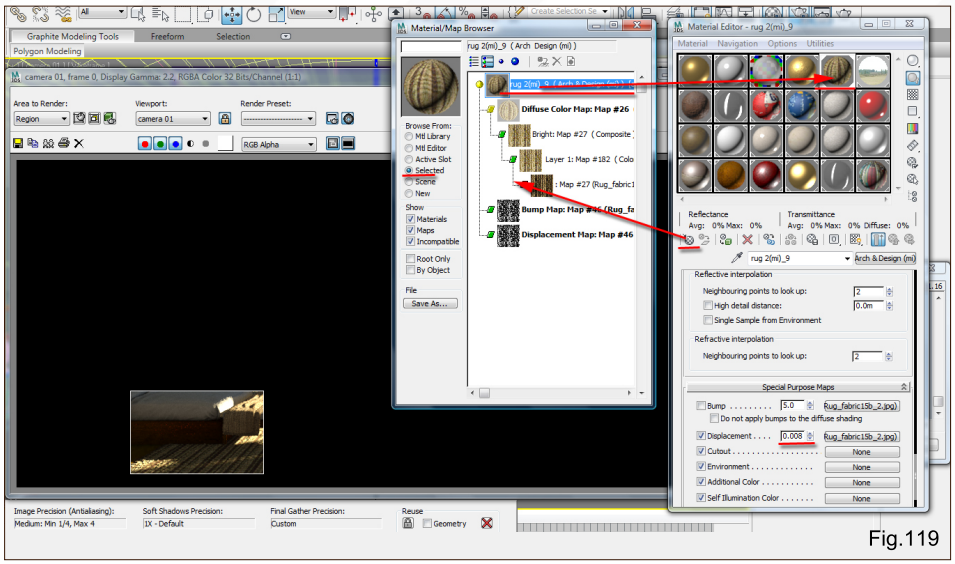
Fig.119

- Test render the scene (**Fig.121**).

77 - The next step is to fine-tune and test render the parameter values of other objects in the scene, using small region renders and the Subset Pixel Rendering. The Subset Pixel Rendering works best, only when a full/region render is in the render buffer, and an object/s in the scene is selected for subsequent renders to effect. It's worth remembering to deselect it before sending out the full renders (**Fig.122**).

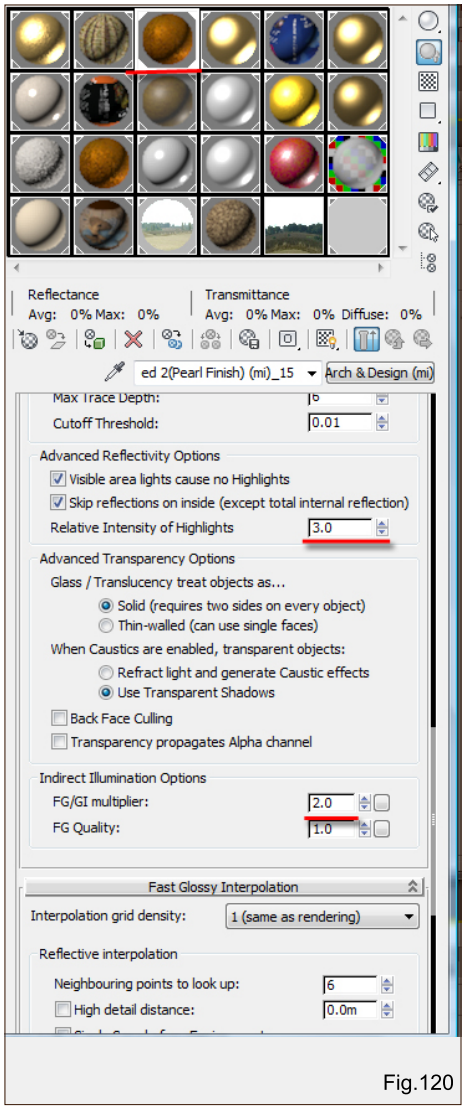

Fig.120

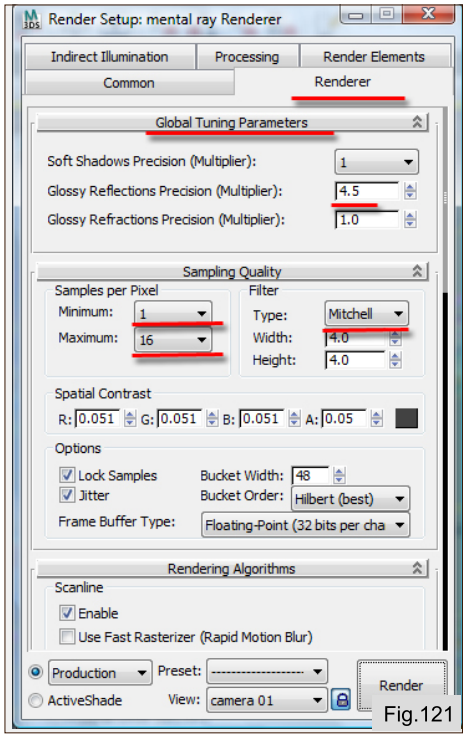

Fig.121

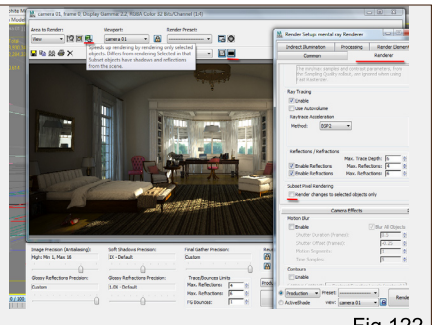
Fig.122

- Select the chest of drawers handle object, in the scene. Increase its Relative Intensity of Highlights value to about 200.0, for greater glossiness highlights.
- On the lamp pedestal, increase its Relative Intensity of Highlights value to about 20.0.
- On the lamp shade, increase its FG/ Multiplier to about 3.0, to make its base color lighter. Also, reduce its Relative Intensity of Highlights to 1.0.
- Increase the FG/GI Multiplier of the bed linen, to make it whiter.

The wall ambient occlusion parameters seem too prominent:

- In the AO parameters, change the Samples value to 65, for better smoothness. Change its Bright color to cream, to give it some color. Colors often help bring renders to life.
- Increase the Spread value to 15.0; and the Max Distance to 0.7m to spread out the AO.

The environment reflected on objects doesn't seem to match the intensity of the background image:

- Increase the multiplier value of the Environment Probe/Chrome Ball (mi), with caution, to prevent artifacts.
- The bump values of the wooden floor seem a bit much; decrease it slightly.
- Finally, to give the image an artistic feel and depth, increase the “mr photographic exposure” Shadows to 1.0; and the Vignetting value to 10.0.

It’s best to test render the “mr photographic exposure” values at lower output resolution and draft sampling quality, for fast turnarounds. Also, ensure you test render full resolutions without the Subset Pixel Rendering selected.

- Finally, it’s worth mentioning that although the above tweaks were made, it is the user‘s choice to ultimately decide what looks best. Then test render the results (**Fig.123 – 124**).

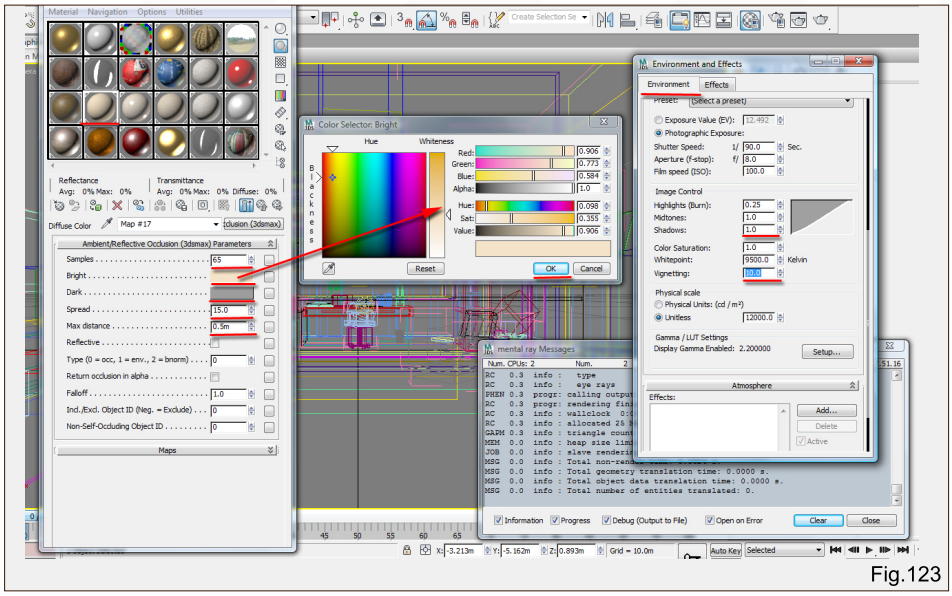
Fig.123

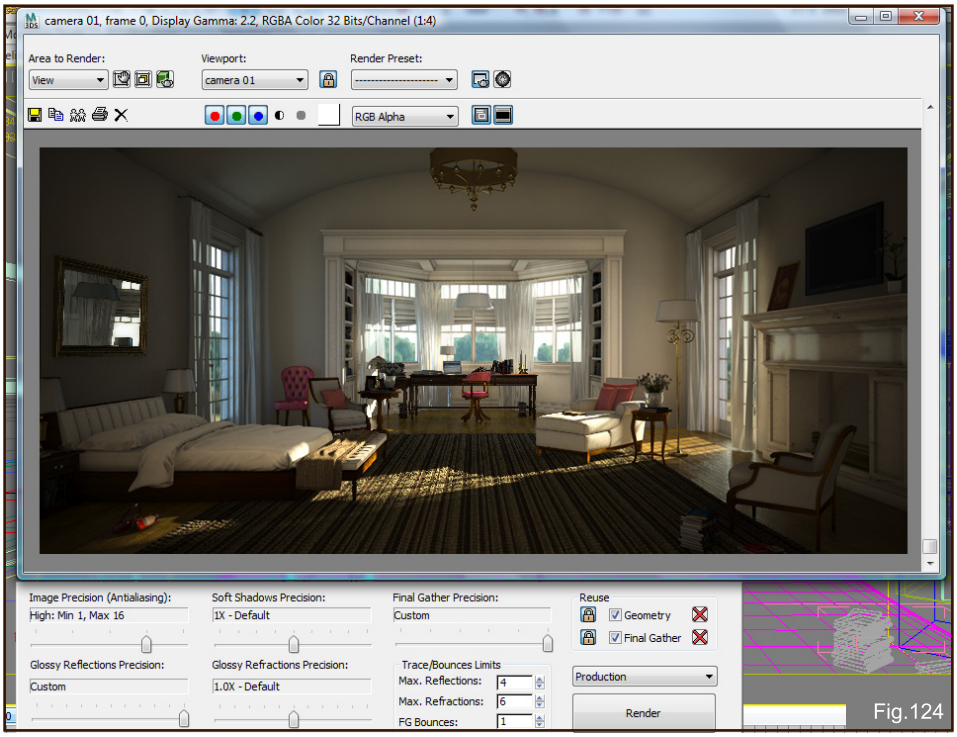

Fig.124

78 - Mental ray is quite powerful in producing glare; camera depth of field and chromatic aberration effects straight from the renderer however, in this exercise we will use 3Ds Max’s rendered elements to facilitate adding some these effects in Photoshop.

The first element to setup is the Z depth. This element will help to add the camera depth of field in Photoshop, if required. It is prudent to setup its parameters prior to sending the final render:

- In the Render Setup, change the Sampling Quality and Global Tuning Parameters to Draft and enable the Material Override.
- Also, reduce the render output size to 500x234 and turn off the FG parameters, for quick results.
- In the Render Elements rollout, click the Add button to open the render elements dialog. Choose the Z Depth element from the list (**Fig.125**).

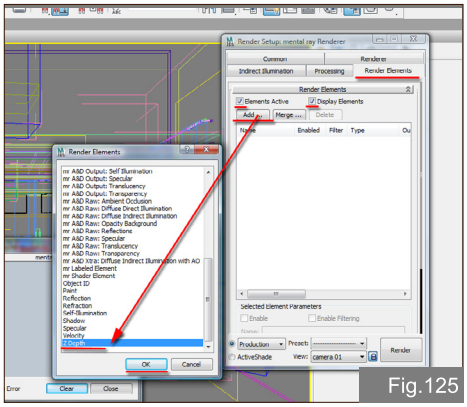
Fig.125

79 - The Enable function needs to be checked. By default, its file destination is setup is the same as the render output file.

80 - The min and max Z values are set from 100 to 300 by default. Tweak and test the render with its settings to see what suits best.

It is worth mentioning that one can increase the original Z Depth contrast in Photoshop (i.e. with curves/levels) to expand darker/brighter areas (**Fig.126**).

81 - The ID elements of materials and objects are equally crucial when sending out the final renders; especially when one is required to address quick changes (**Fig.127**).

One should start tagging the objects and materials from the start of the project, as objects and materials can quickly grow to unmanageable numbers.

82 - Once satisfied with most parameters, one can begin to prepare the scene for final rendering.

- In the Common rollout set the final output size to 3500x1638 pixels. Note that there's no need to render higher resolution, as the render is looking sharp and without noise.
- In the Render output group, click on the Files toggle to choose the file location and format. This new location will subsequently alter the original rendered elements location.
- I personally use Targa Image file formats, since all the extra rendered elements are being saved, however, a growing number of users are choosing ILM's OpenEXR image file format.

Note that when opening these files in Photoshop, one will be required to turn its default 32bits/channel mode to 16bits or lower in order to utilize some of the

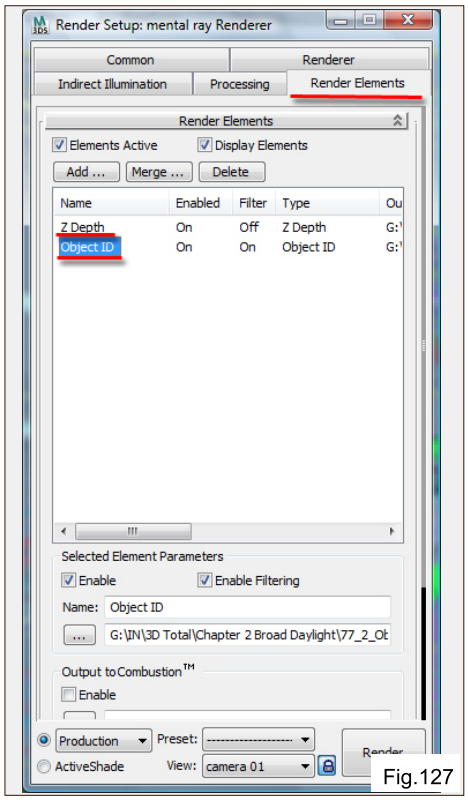

Fig.127

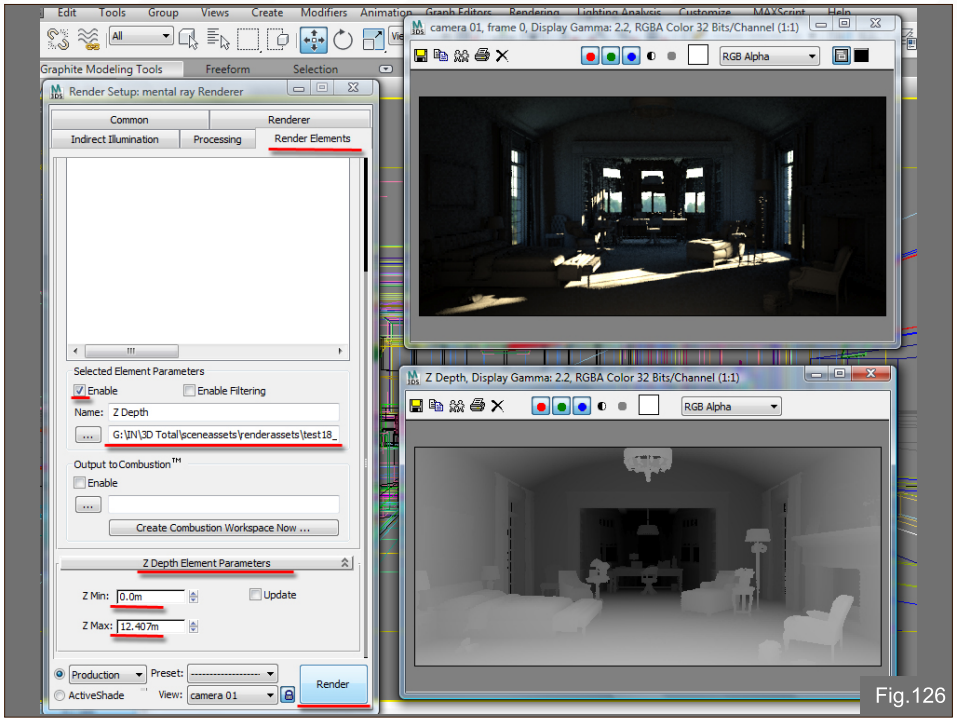

Fig.126

Photoshop's filters and layer adjustments (**Fig.128 – 129**).

83 - On the Renderer rollout, increase the Glossy Reflections Precision (Multiplier) value to 4.5, as before.

- Change back the Sampling Quality to 1/16 samples per pixel and the filter type to Mitchell.

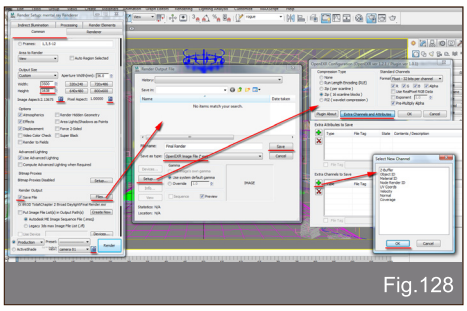
Fig.128

84 - With everything set, one can finally click Render to see the final high resolution render (**Fig.130 – 131**).

85 - Alternatively, Distributed Bucket Rendering (i.e. DBR) or Net Render rendering techniques could be used for those fortunate enough to have additional computers:

- **Distributed Bucket Rendering**: Ensure to use one method or the other, not

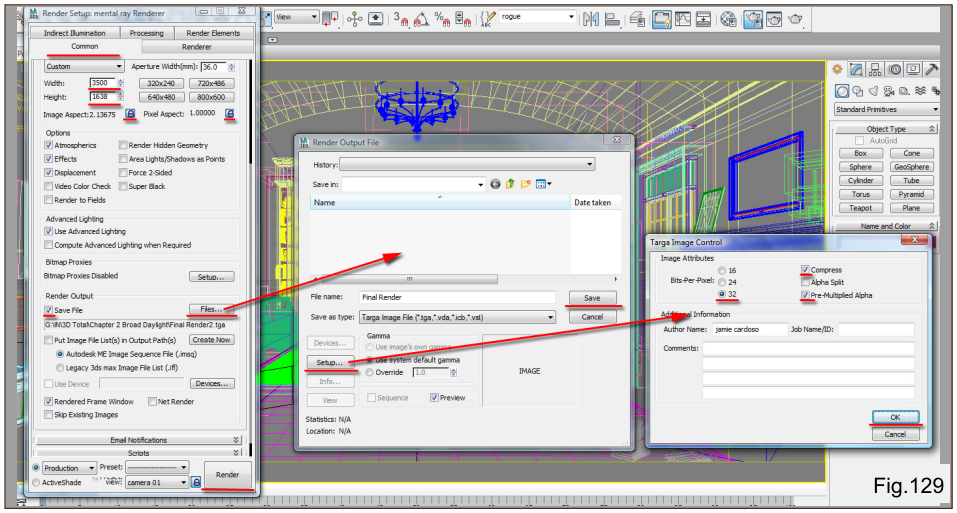
Fig.129

both at the same time. Also, one should not use this rendering method for animations. It works best with still images.

All files should be (i.e. FG; bitmaps; file output path etc) in a shared drive (not local drives i.e. C drive, etc).

Open the Render Setup. On the Processing rollout, under the Distributed Bucket Rendering parameters, check the Distributed Render function.

Click the Add toggle to add the IP address. The Add/Edit DBR Host dialog box should appear. Type the IP address number followed by OK to close the dialog box. Keep adding as many as available and allowed.

To edit, simply select one machine at time and click edit.

To monitor the rendering process, simply open the mental ray message window.

Check all its options (i.e. information, progress, debug (output to file), open on error etc) (**Fig.132**).

- **Net Render**:
Ensure that all your files (FG; bitmaps; file output path etc) are in a shared drive (not local drives i.e. C etc).

The Net Render toggle needs to be checked, then click render. The Network Job Assignment dialog box should be prompted.

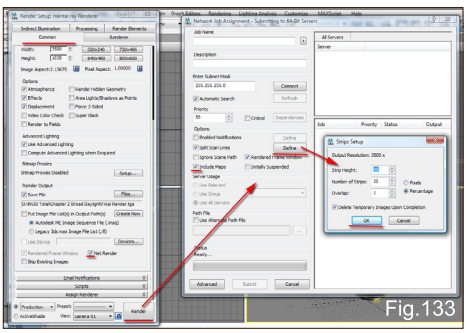
Fig.133

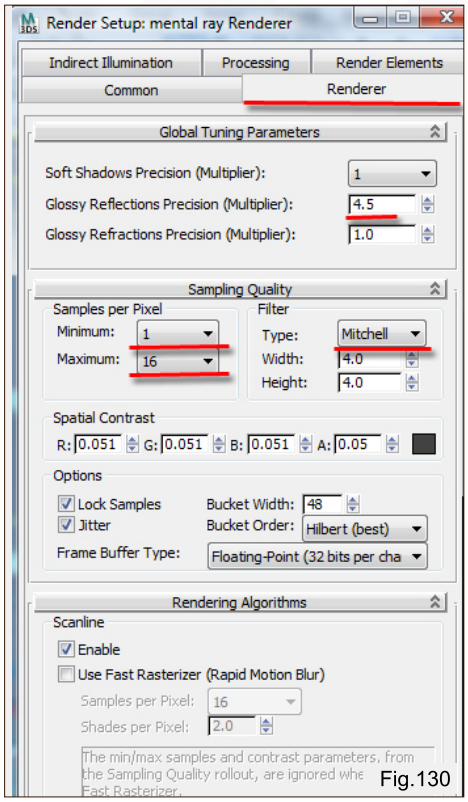

Fig.130

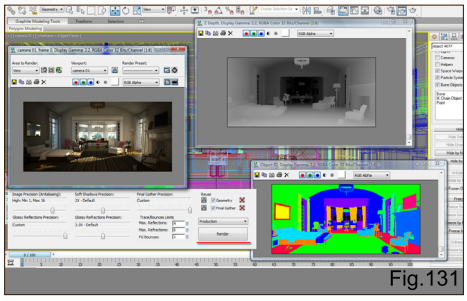
Fig.131

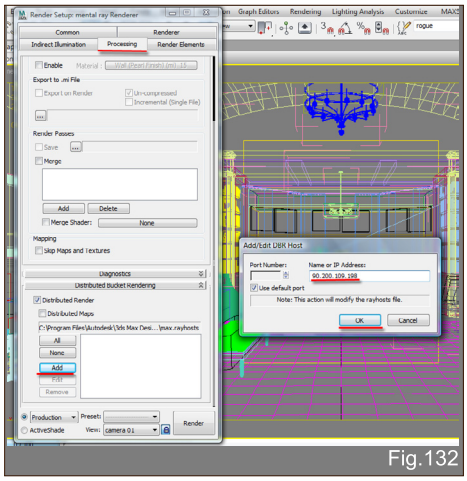
Fig.132

Ensure that the Include Maps function is enabled, in case there are any bitmaps or mapping coordinates missing.
Click Connect, to see all the available machines in the server. Select the desired machines from the server field name.

On the Server Usage group, choose Use Selected to enable only the selected machines to be used.

In the Options group, choose the Split Scan Lines option, followed by clicking on the Define toggle. The Strips Setup dialog box should be prompted: set it to pixels; the overlap value to 2; the number of strips to 10 and strip height to 48; and click OK to close the dialog box. Click on Submit to render (**Fig.133**).

86 - **Ambient Occlusion (AO)**:
It is common practise to save out the AO as a separate pass, for compositing. This methodology enables users to have full control of its appearance without having to re-render.

- Open the Material Editor and choose a new material slot by dragging and dropping from one editor slot to another.
- Rename it, and load a new mental shader from the Material/Map Browser list (**Fig.134 – 135**).

87 - With the mental ray shader loaded, click on its Surface toggle to load up the Ambient/Reflective Occlusion shader from the Material/Map Browser list.

Its parameters should load up; change Samples Value to 60; the Spread value to 7.0 and Max Distance to 0.3.

Note that these values worked best for the effect intended, however, one may try different values, if desired (**Fig.136 – 137**).

88 - Next, open the Render Setup dialog and select the Processing rollout.

Enable the Material Override again, and drag and drop the AO material slot to the Material Override toggle. Choose Instance method (**Fig.138**).

89 - Disable the FG and open the Environment and Effects dialog.

- Disable the Use Map function and its color swatch to white. This is to make the background color white.
- Keep the image Sampling Quality as before 1/16 samples per pixel and Mitchell filter.
- Finally, turn off the exposure controls and click render (**Fig.139 – 140**).

90 - **Photoshop**

Photoshop is very powerful and useful when incorporating quick changes and/or effects that would otherwise be time consuming to address in Max alone.

Having said that is equally important to have relatively decent renders from Max, at one's disposal for Photoshop. This work process will ultimately prove very fruitful for one's final piece.

In this final part of the tutorial, we will bring in the main rendered image, along with its pre rendered elements.

- Although we had rendered numerous

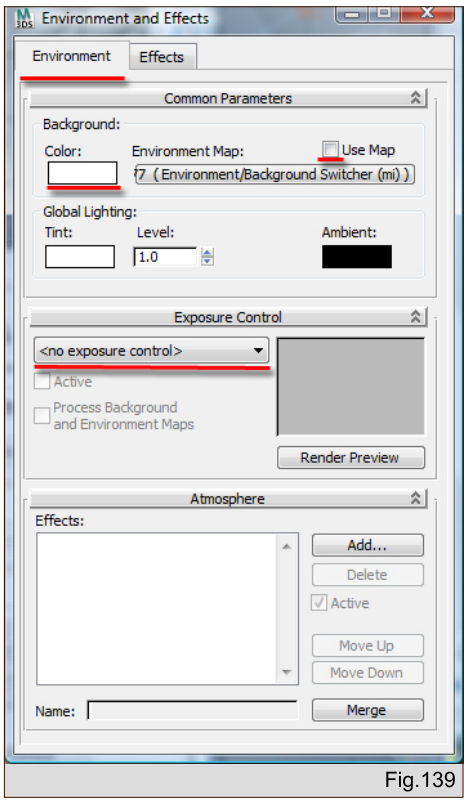

Fig.139

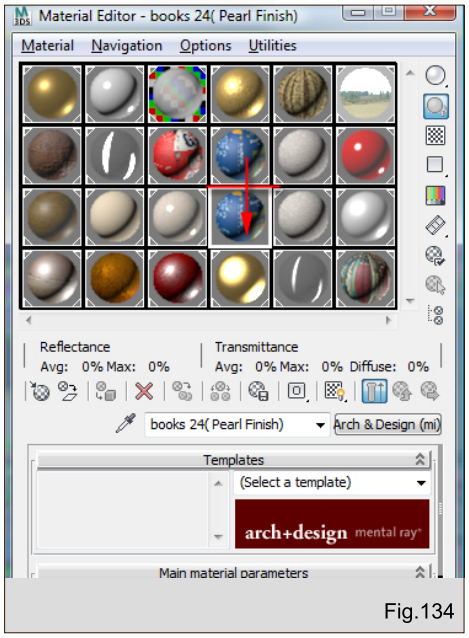

Fig.134

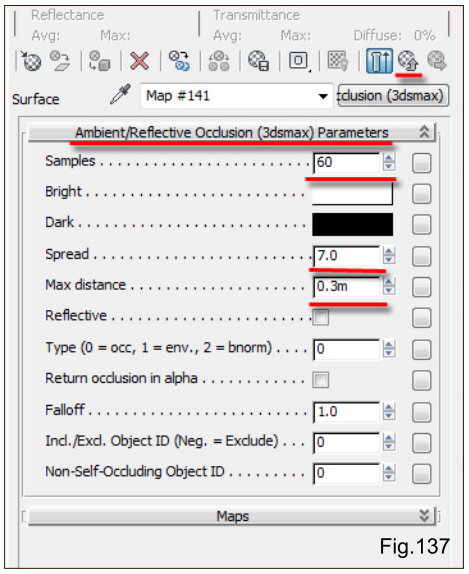

Fig.137

elements, we will be using the Z Depth and AO pass only, for the purpose of this exercise. Open the main render along the above mentioned elements.

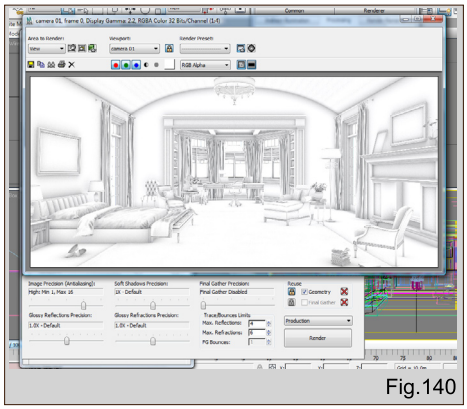
Fig.140

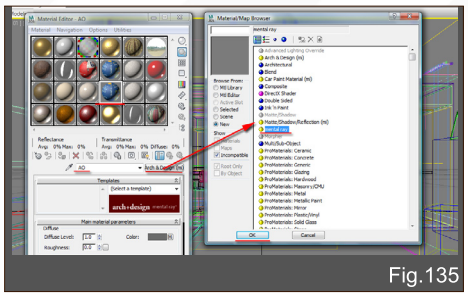
Fig.135

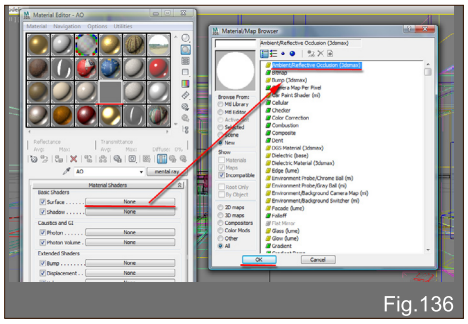
Fig.136

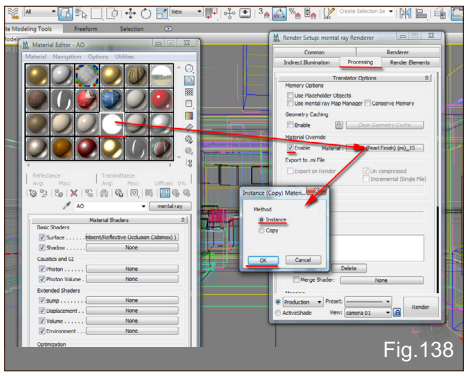
Fig.138

- Select the rendered image. On its Layer rollout duplicate it by right clicking and selecting the Duplicate Layer option.
- Name it Render.
- Change its original white color to red by right clicking on the layer and selecting the Layer Properties option from the list. This will help differentiate between the layers (**Fig.141 – 143**).

91 - The next step is to emulate the Bloom camera effect. Note that this effect could have been easily achieved with mental ray however, we have decided to do it in Photoshop, as it gives us the flexibility to quickly edit/choose the areas affected by this effect.

- Open the Channels dialog and press Ctrl + left click on the Alpha layer to select its pixels. Note that, the alpha channel came

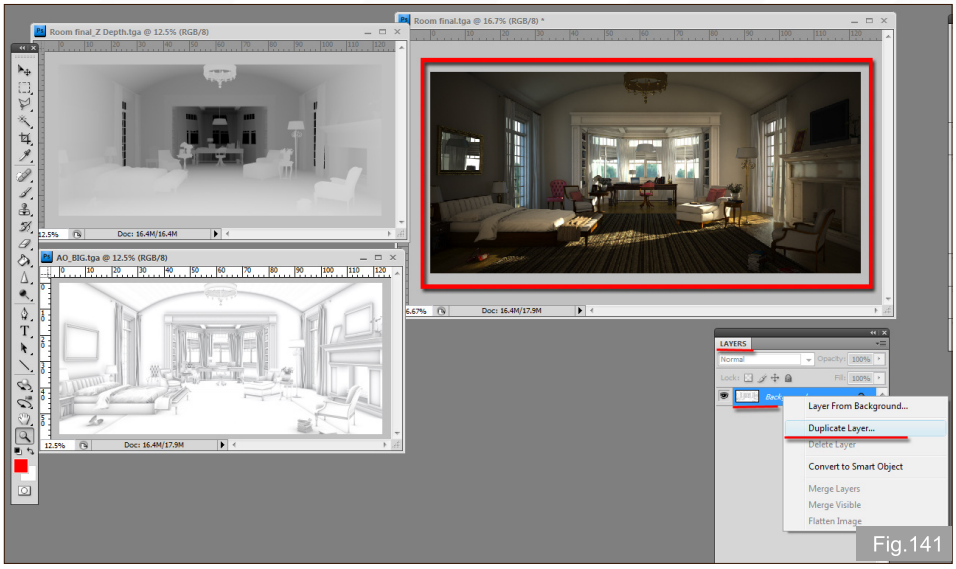

Fig.141

integrated with the TGA rendered file.

- Use the Polygonal Lasso tool (L) to subtract (Alt) and/or add (Shift) selection areas for the bloom effect. These areas should be white, preferably.
- While the selection is still on, save it by clicking Select from the main toolbar and choosing the Save Selection option, from the dropdown list. Name it Bloom on the Save Selection dialog name field.

This new selection should now be added to the channels list (**Fig.144 – 147**).

92 - Next, while the selection is still on, select the Render layer, followed by copying (Ctrl + C) and pasting (Ctrl + V) to create a new layer.

- Change its layer properties color to blue, and name the new layer “bloom”.
- Next we are going to apply a nice Gaussian Blur filter to emulate the bloom effect. Duplicate the layer to keep the original copy. It is prudent and common practice to keep the original layers prior to editing it. Click on the Filters rollout and choose the Gaussian Blur filter from the dropdown list.
- The value of 11.1 seemed to have worked best, however, you may want to try different values.
- For future reference, it is always recommendable to rename the layer according to the filter applied, plus its values (i.e. “Gaussian blur 11.5”). This will make it easier to remember the original filter applied (**Fig.148 – 150**).

93 - The next stage is to tweak its brightness levels.

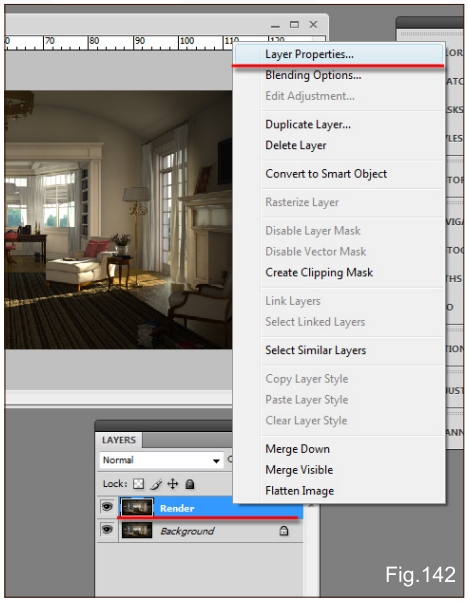

Fig.142

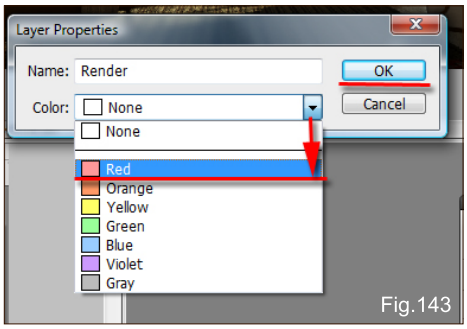

Fig.143

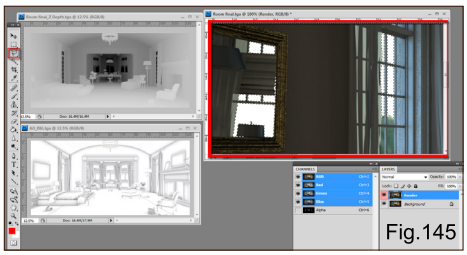
Fig.145

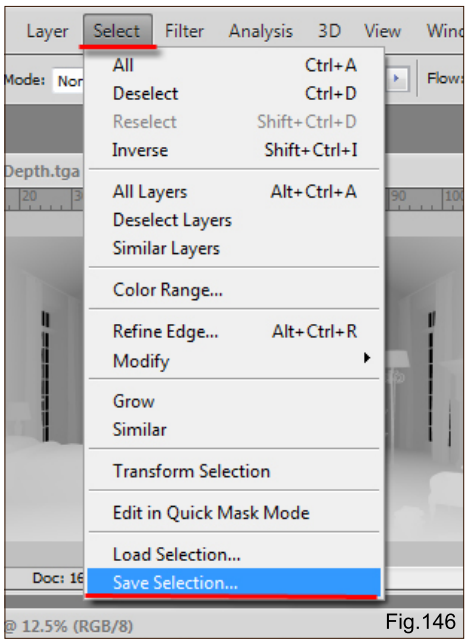

Fig.146

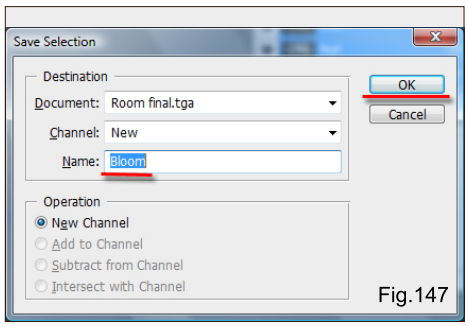

Fig.147

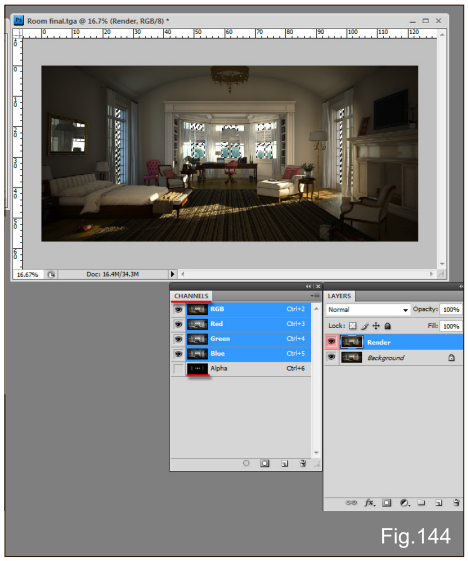

Fig.144

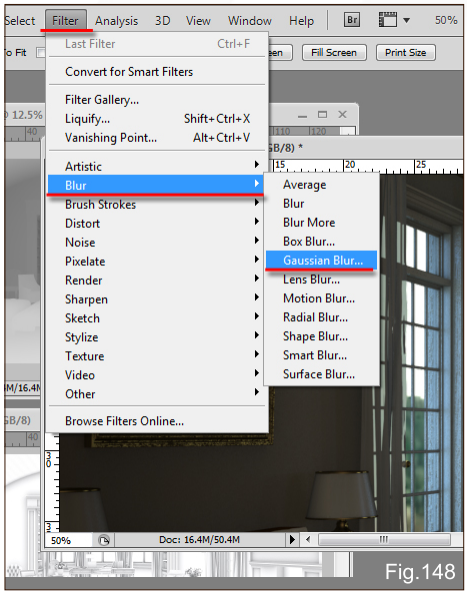

Fig.148

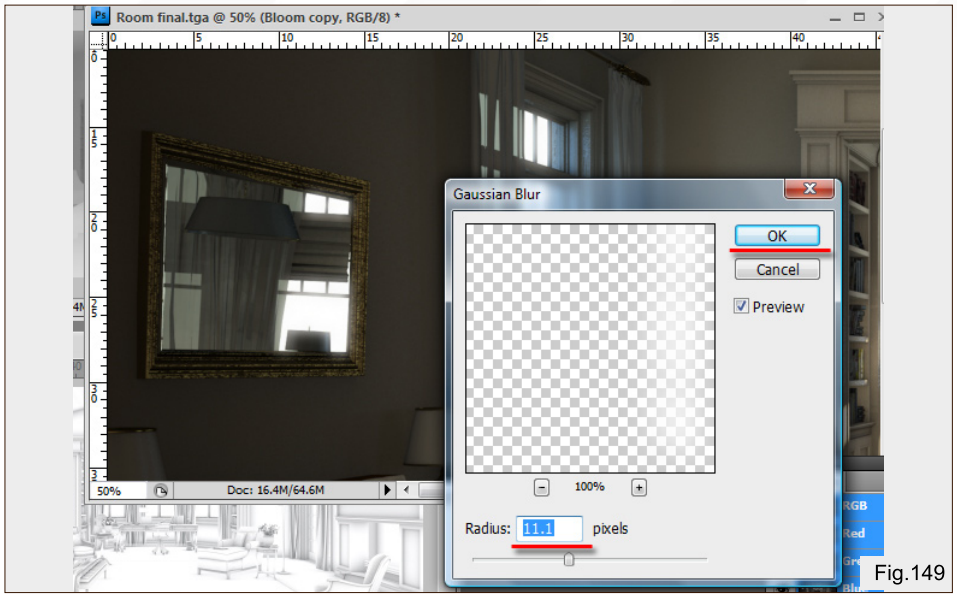

Fig.149

- Click on the Create New Fill or Adjustment Layer button; on its pop up list, choose the Curves adjustment layer.
- Its parameters should load up. Tweak its values by adding and moving points, until satisfied (**Fig.151 – 152**).

94 - The next phase is to color grade it with the Color Balance adjustment layer.

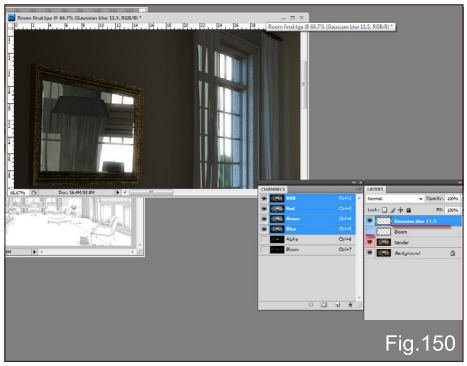
Fig.150

- Choose red and deep blue tones.
- Create another Color Balance adjustment layer. This time, use cyan and yellow tones (**Fig.153 – 154**).

95 - The next step is to balance these colors with the Hue/Saturation Adjustment layer.

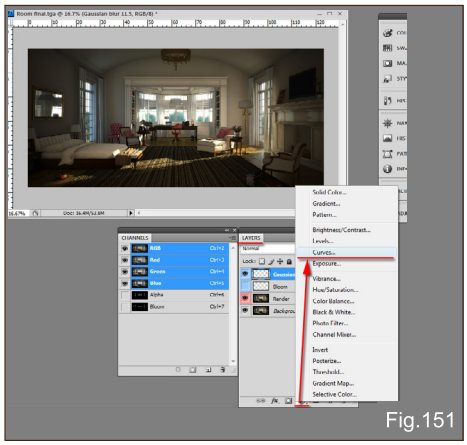
Fig.151

- Add the Hue/Saturation Adjustment layer. Decrease the overall (i.e. master) color saturation to about -6.

The next stage is to tweak with specific colors. The first color to concentrate on is red.

- Choose the red color from the palette list.
- Increase its Saturation to about +40. This parameter will only affect the red tones of the image. Also, decrease its Lightness parameters to about -9.
- Increase the yellow's Saturation to about +6; the green's to about +5 and the blue's to +73

Note that these values can be changed, if desired (**Fig.155 – 156**).

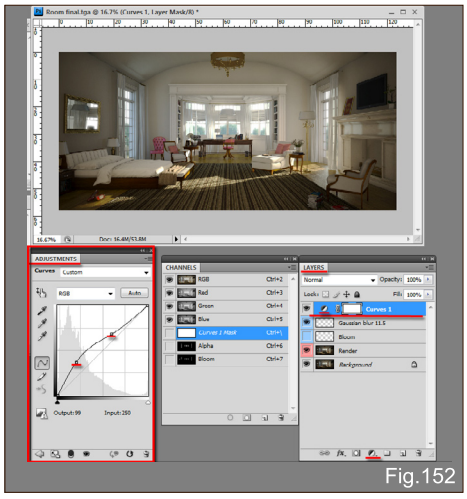
Fig.152

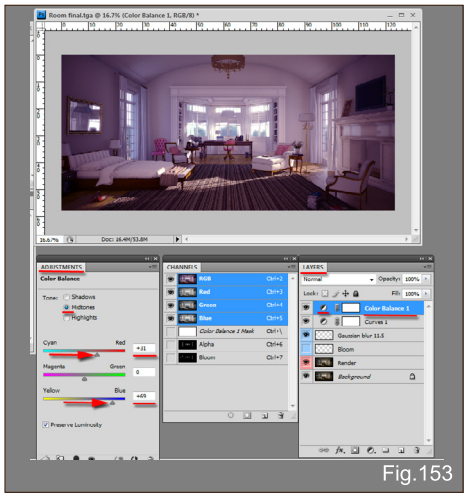
Fig.153

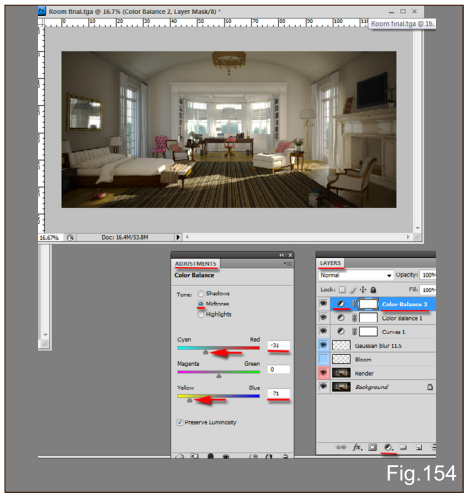
Fig.154

96 - Now it is time to add the AO pass for additional depth.

- Select the AO document and duplicate it.
- In the Duplicate layer dialog; under the Destination group, choose the relevant document (i.e. “Room final.tga”) destination, and name the layer as AO. This will paste this duplicated layer in the chosen document, with the appropriate name.
- In the “Room final.tga” document, move down the AO layer to be placed on top of the Render layer (**Fig.157 – 158**).

97 - The next step is to blend the AO layer and edit its appearance.

- Set the AO layer blending mode to Multiply type.
- Create a mask for the AO layer by clicking on the Add Vector Mask button. This will help edit this layer with the brush tool (B).
- While the AO layer mask is selected, enable the brush tool (B) and begin brushing around the areas of the image that you desire to omit or have less prominence. The mask layer works best with black and white colors(X). Black = to omit pixels(X); White = to bring pixels to prominence(X). Moreover, the opacity function on the main toolbar helps to set the visibility of the brush strokes.
- Finally, one can duplicate the AO layer to accentuate its appearance (**Fig.159 – 161**).

98 - Once satisfied with the image, save it as TIFF, if desired. Also, one can color grade the final image further, if desired. In fact, there is a PSD file called “Room final_ composition”, with additional color grading.

Tiff file formats are highly recommended by the reprographics, as these file types retain the original quality of the render. JPEGs should only be used for email and web purposes (**Fig.162**).

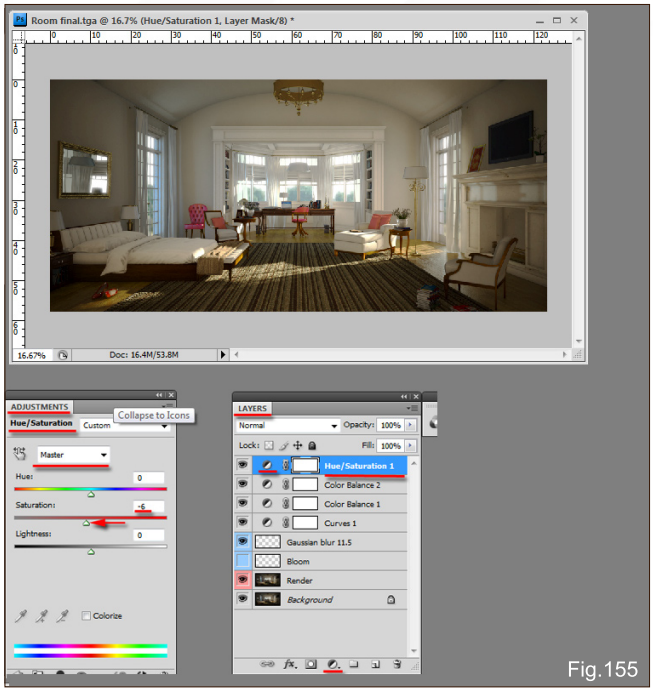

Fig.155

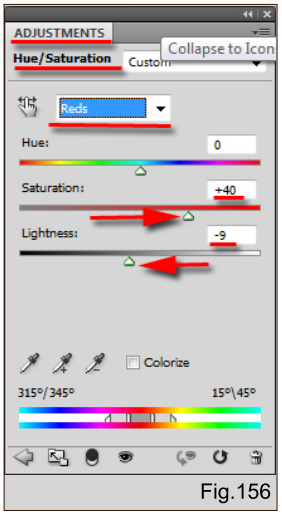

Fig.156

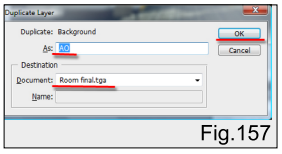

Fig.157

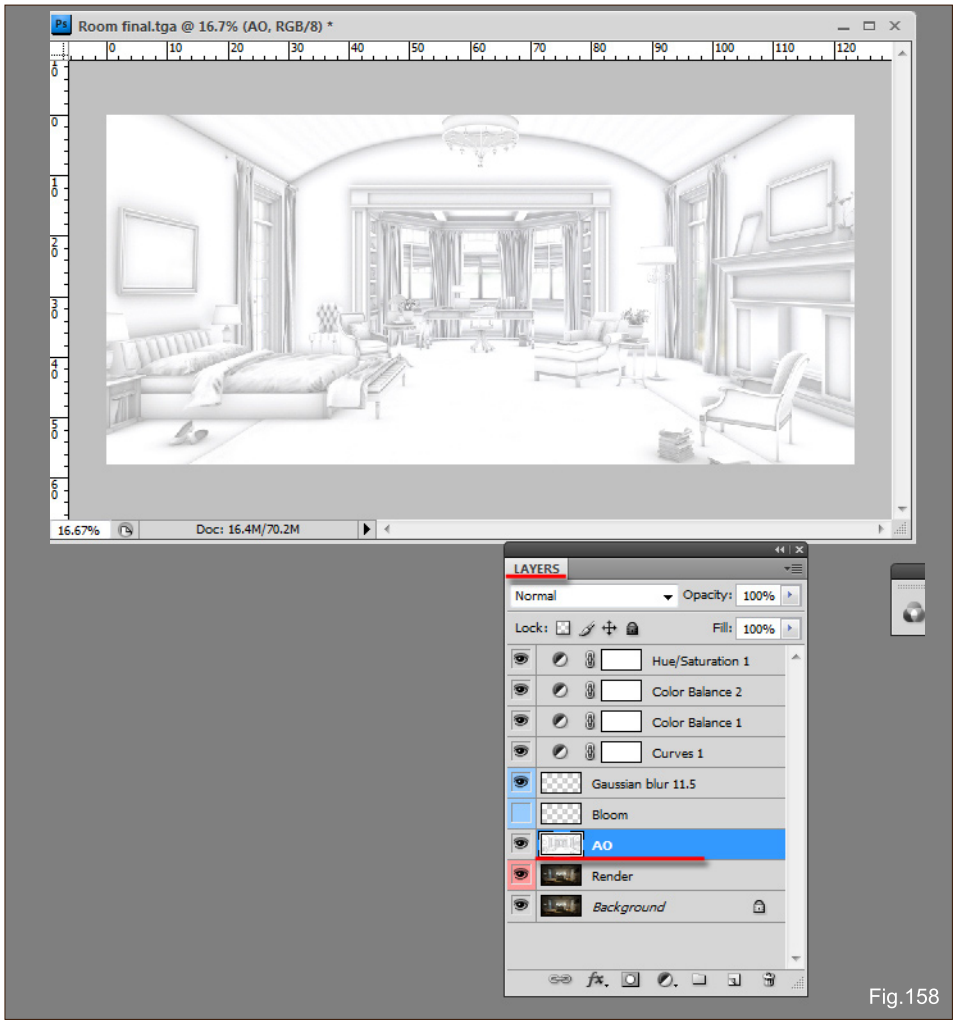

Fig.158

99 - Artists often use camera effects such as Depth of Field (DOF) and Chromatic Aberration for finishing touches and additional realism to the image. These effects work best when they are subtle, especially in the visualisation industry.

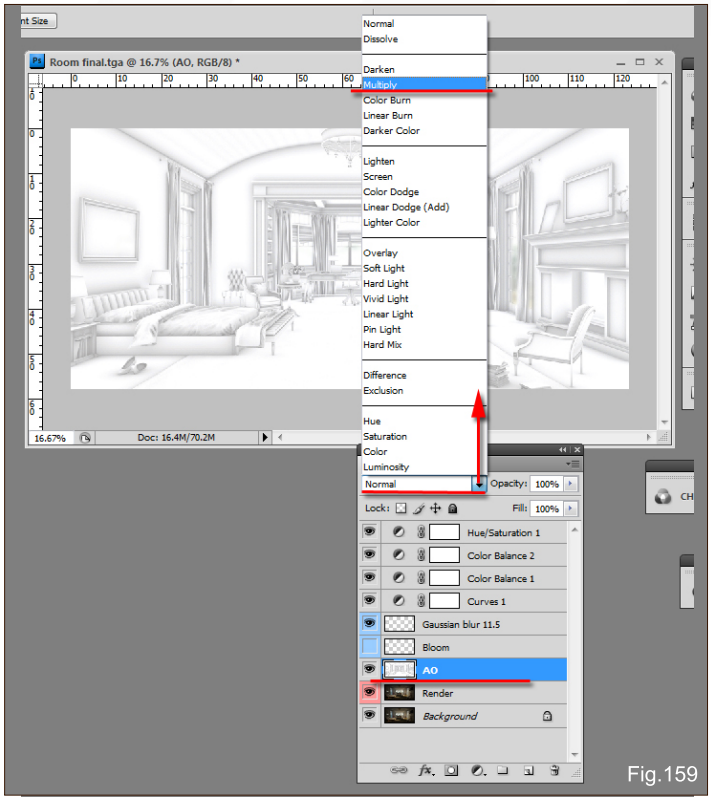

Fig.159

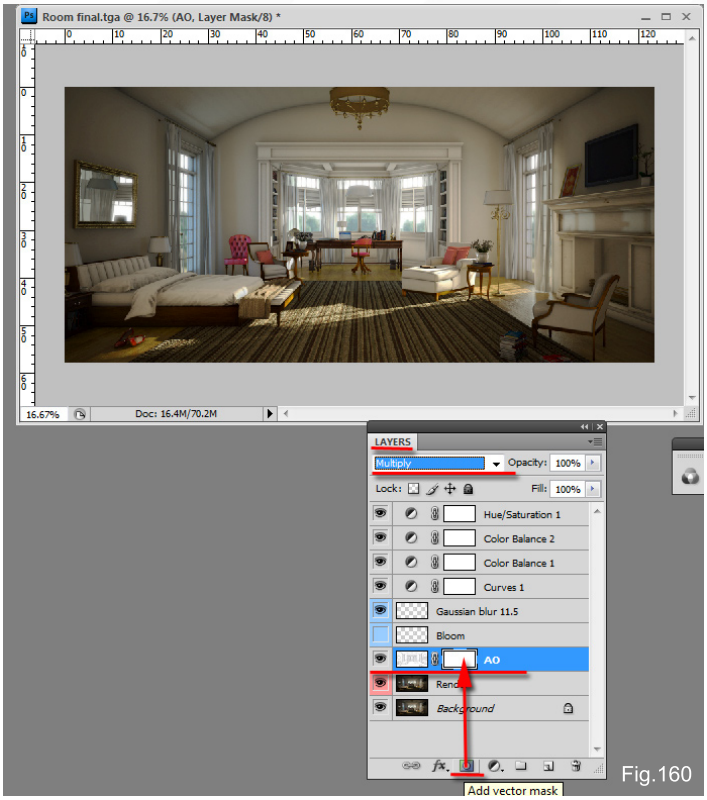

Fig.160

As previously mentioned, mental ray can easily achieve these effects however, one is advised to emulate them in post-production, for quick turnarounds and feedback, especially when you're dealing with impatient clients who want work quickly and are determine to give you a run for their money.

100 - **Chromatic Aberration**

- Open the flattened TIFF file in Photoshop.
- Open the Channels dialog in Photoshop.
- Select the red channel layer and move it once to the left and upwards, using the move tool (V) (**Fig.163 – 164**).

101 - Select the green channel layer and move it down once. And finally move the blue channel layer to the right once. Note that one can move these channel layers in a different direction and/or not all of them, if desired.

Also, it is common practise to use two different image layers (i.e. one with and another without the Chromatic Aberration effect) to mask out with Vector Mask tool

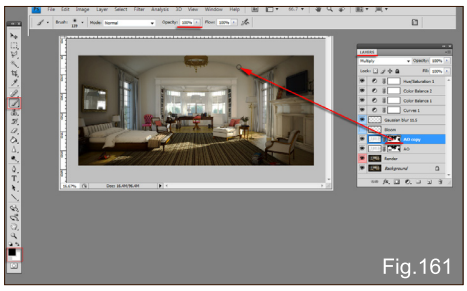
Fig.161

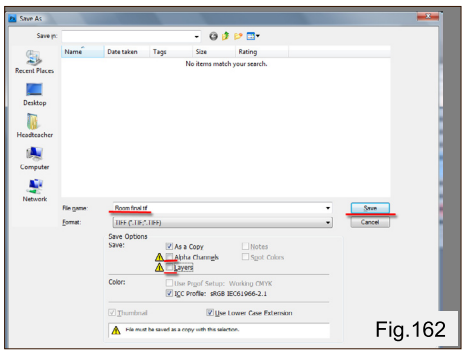
Fig.162

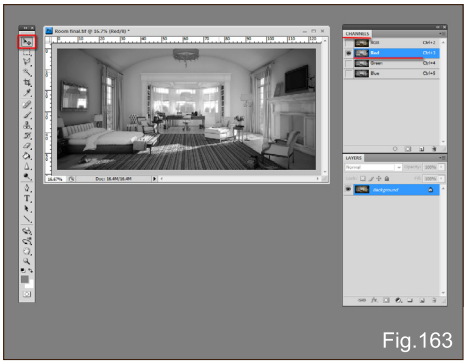
Fig.163

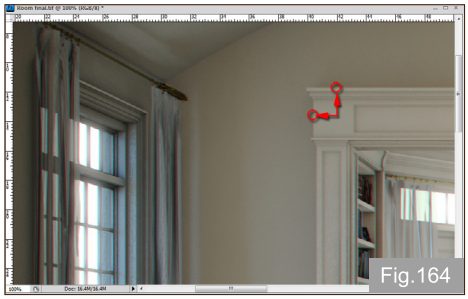
Fig.164

and/or use the layer opacity to fade out the irrelevant areas (**Fig.165**).

101 - **Depth of Field**

To add the Depth of Field, we are simply going to use the Z Depth render element in conjunction with Curves, to save out the appropriate mask for DOF camera effect from Photoshop.

- Select the Z Depth document.
- Add the Levels adjustment layer
- Tweak with its settings until there is a clear contrast between colors (**Fig.166 – 167**).

102 - Once satisfied, duplicate the original.

- Select both the duplicated layer and the Levels adjustment layer.
- While both layers are still selected, merge

them by right clicking and selecting the Merge Layers option, from the pop up list (**Fig.168**).

103 - With enough contrast in the image, it's much easier to select the desired areas.

- While the relevant layer is selected, go to the Select tool rollout and choose the Color Range option from the list.
- In the Color Range dialog, choose the selection range desired, with the slider. Click OK to close it, once satisfied (**Fig.169 – 170**).

104 - While the selection range is on, in the document, go to the Select rollout toolbar, and choose the Save Selection option from the dropdown menu list.
- In the Save Selection dialog, choose the destination of your document (i.e. the pre-saved TIFF image), and name it DOF. The selection is now part of the pre-saved TIFF document, as an alpha channel.

105 - With everything in place, it is now time to add the DOF effect.

- Select and duplicate the main layer.
- Click on the Filter main toolbar. Choose Blur from the dropdown list, followed by Lens Blur.


Fig.165

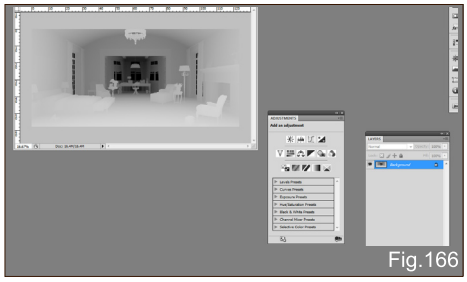
Fig.166

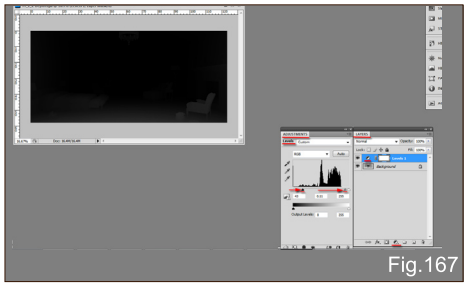
Fig.167

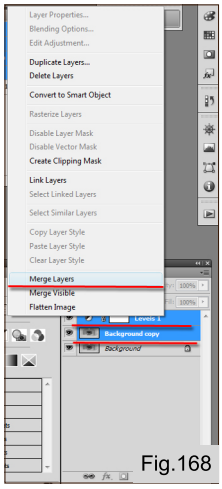
Fig.168

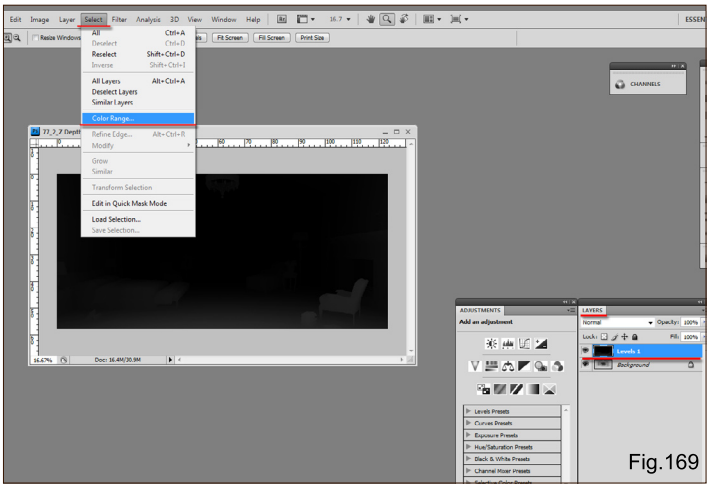
Fig.169

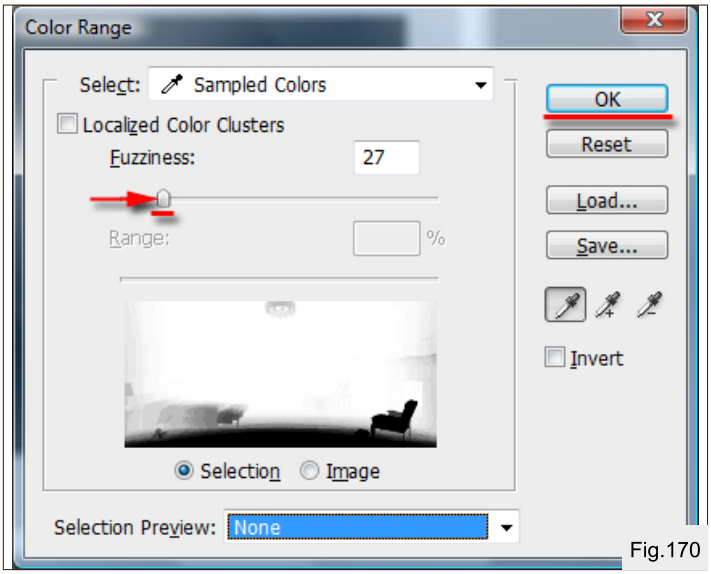

Fig.170

- Its parameters are self explanatory. Load the pre-saved DOF selection channel from the Depth Map group option.
- Check the Invert function to invert the areas being affected by the DOF.
- Tweak with its parameters to see what works best for you.

final colour grade was achieved using colour adjustment layer techniques, as discussed earlier.

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Viktor Fretyán

Textures Supplied by:

3DTotal Total Textures

Tutorial by:

Jamie Cardoso

For more from this artist visit:

http://jamiecardoso-mentalray.blogspot.com/

Or contact them:

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Environment Lighting

This five part series will focus on the topic of setting up a variety of lighting rigs that reflect natural lighting at different times of the day and manmade interior lighting. Each of the chapters will use the same base scene as a starting point, and will show a step by step guide to finding a lighting and rendering solution that best reflects the desired lighting situation.

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Chapter 1 | June Issue 058
Sunset / Sunrise

Chapter 2 | This Issue
Broad Daylight

Chapter 3 | Next Issue
Artificial Light - Bright over head light at night

Chapter 4 | September Issue 061
Artificial Light (Night-Time) - Mood Lighting (Low-Level - Romantic)

Chapter 5 | October Issue 062
TV-Lit (Night-Time) with Low-Level Lighting

CHAPTER 2 - BROAD DAYLIGHT

Software used: 3ds Max + V-Ray

Welcome again! This time I will try to explain a method of lighting the scene to make it look like it's broad daylight. We have only one light source again and no artificial lights, only the Sun. As I wrote in the last chapter, there are many other ways to light this scene to reflect a broad daylight environment. Last time I used a V-Ray dome light to provide ambient light, so this time let's try something different!

We have the option of putting V-Ray planes in each and every window. This is the most commonly used method so I'm not going to do this here, but let me give you a few words of advice if you do choose to use this method: If your window consists of many parts (as in our case) use as many V-Ray lights as there are parts of the window, instead of using only one big V-Ray plane. Make the planes smaller than your actual window to provide sharper shadows (**Fig.01**). It is a bit of a cheat but I find it effective. Also tilt the planes a bit to the ground, like the light comes from above. And of course copy them using Instance. If they differ in shape use the Scale tool.

But for this tutorial I'm going to cover a different method. I will only use a V-Ray sky in the background slot and no actual light source for ambient light. This might not be the most appropriate way because it does not provide any actual shadows. Why use it then? Because this is fast to render and that's a big advantage! Therefore this is what I use almost every time I work on an assignment with a deadline.

So let's do it already! I put the V-Ray sunlight in top view and it automatically puts a V-Ray sky in the background slot. That's okay, so let's just press OK and from now on we only have the Sun's Intensity multiplier to think about. Well almost, because we will have to set the color mapping too.

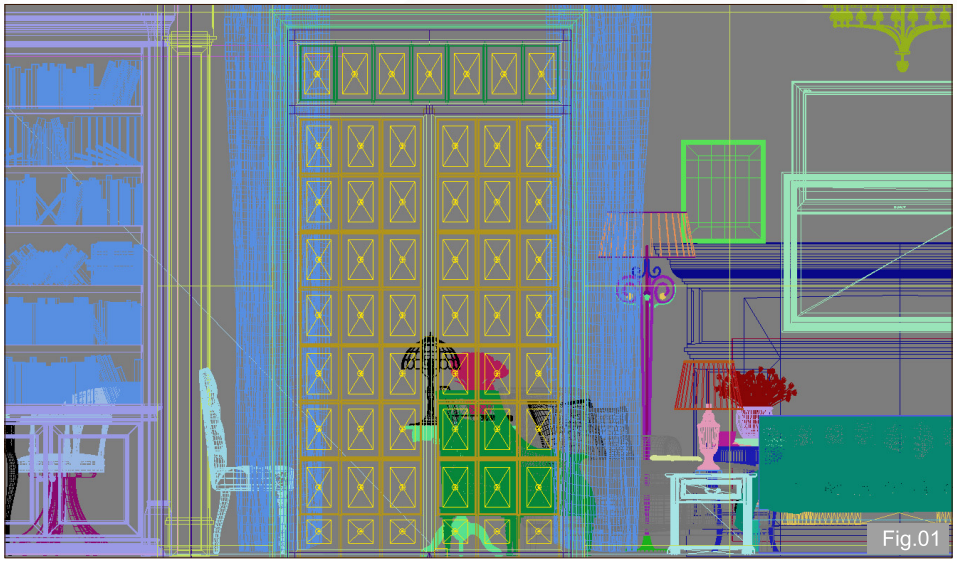
Fig.01

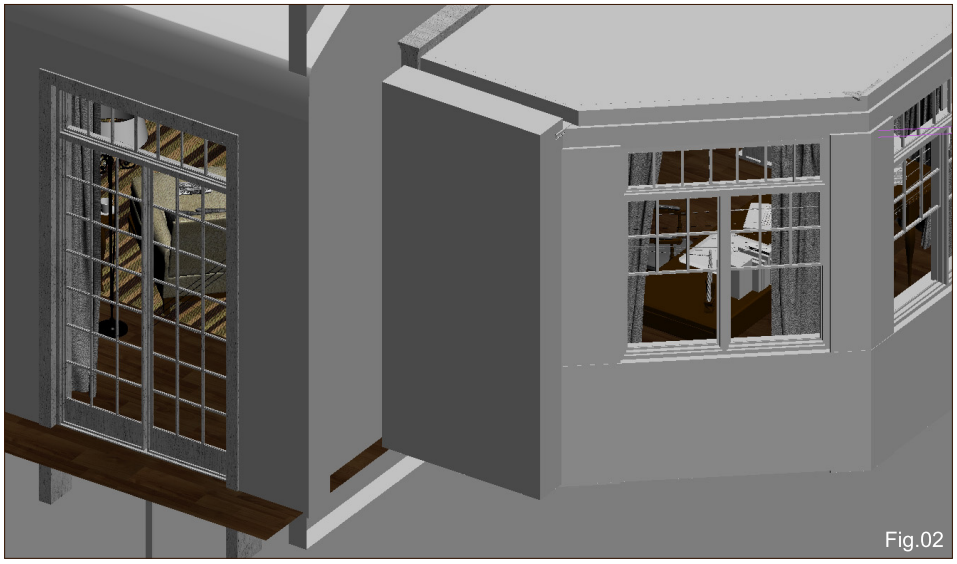
Fig.02

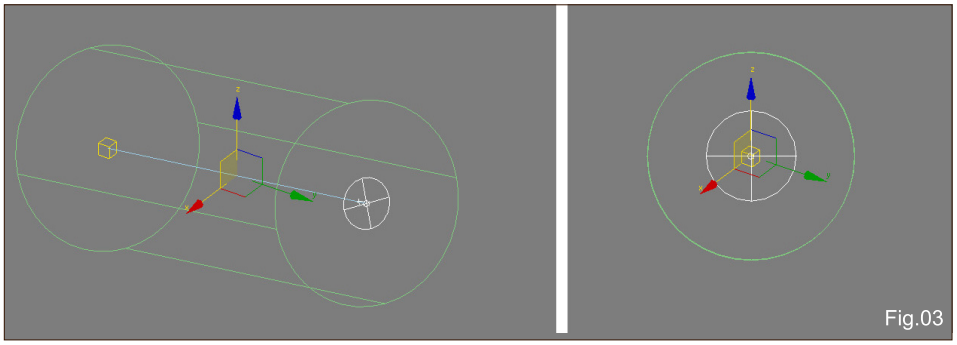
Fig.03

But first let's take care of the angle of the Sun. I do this by switching to top view and rotating the angle of the viewport. In this view I rotate it until I see through the window the same way as I would like the Sun's rays to go (**Fig.02**).

Then by pressing Ctrl + G, I hide all the geometry and only made the light visible. Now just move the Sun "over" the target without changing this view! This way we make sure the rays of light follow the same path as the one we just set the view to (**Fig.03**).

I wish I could bring more sunlight to the scene but I felt that it would be a bit unrealistic since it should be about noon.

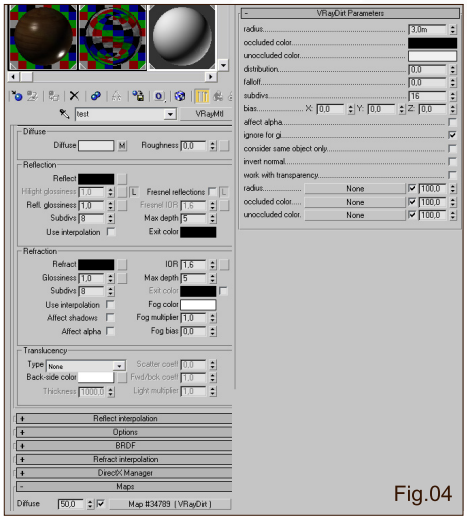
Fig.04


Fig.05

For the direct sun light I use a V-Ray sun again. As the sky is controlled automatically there's only one value we have to think about!

Since I'm using a standard camera here let's start by going to color mapping and changing from Linear to Reinhard. Reduce the Burn level to 0.0. We can use an override material to speed up the render times a bit (**Fig.04**). Render qualities are kept low for the same reason. And now let's see what we have got (**Fig.05**). It is close to white so the result will be really bright, as intended.

I think it looks good already! I like that it's burnt a bit where the Sun hits the surfaces. But maybe it's a bit too bright overall, even for a white interior. Let's reduce the Intensity multiplier to about 0.85. This will make the overall brightness a bit lower, but will also reduce the burning effect on the surfaces. So to compensate this let's raise the Burn level of the color mapping from 0.0 to 0.05.

I think it is now ready to render, but first let's see the render settings (**Fig.06**)! I've had to raise the HSP subdivs and the interpolation samples in the Irradiance map settings due to the fact that there are no V-Ray planes in the windows, so there are no real shadows. If I don't do that the render will come out full of blotches!

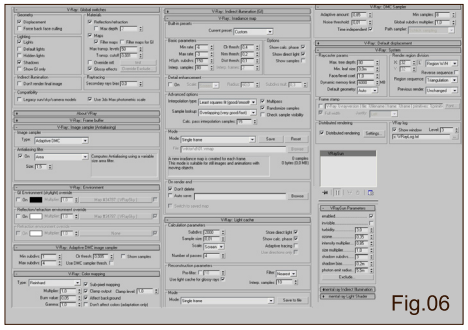
Fig.06

Let's see the render now (**Fig.07**)! The lighting is alright so let's keep this one, but it needs some retouching as it looks quite flat.

First let's render an Ambient Occlusion pass! For that switch off default and hidden lights, hide the Sun and put an override material in the


Fig.07

override material slot again. Use these settings for that (**Fig.08 – 09**). Now that we have that rendered too we can combine it in Photoshop. Just copy/paste it as a new layer on top of the render and turn the blending mode to Overlay!

Made a few more adjustments in Photoshop and the image is finished (**Fig.10**). Out of all the tutorials of this series this is probably the easiest and shortest. It isn't the most elegant way to render a scene, but sure is the fastest and easiest to set up. Therefore I advise you to use it anytime you are working to a deadline, or where you have lots of windows with different shape and locations. I hope this has been useful and thank you for reading!

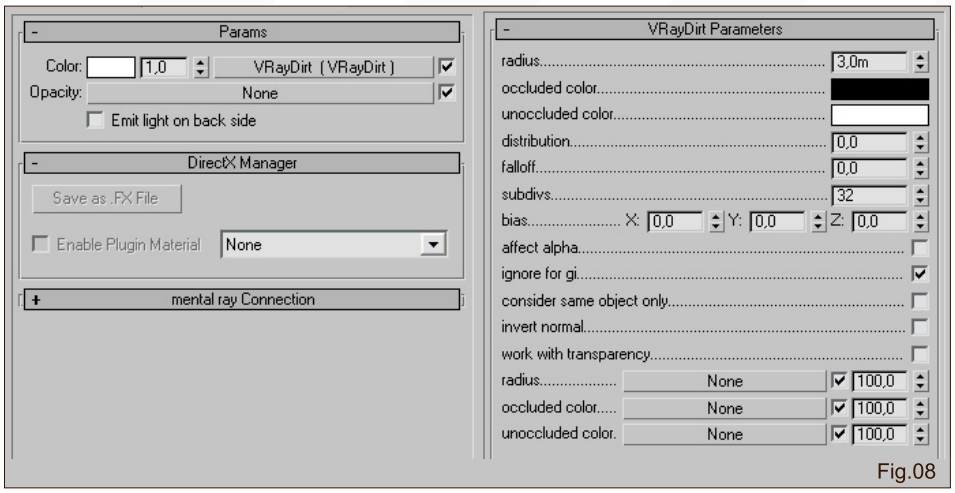

Fig.08


Fig.09

Tutorial by:

VIKTOR FRETYÁN

For more from this artist visit:

http://radicjoe.cgsociety.org/gallery/

Or contact them at:

radicjoe@yahoo.com

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Fig.10

Maya + mental ray

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Scene Created by: Viktor Fretyán | Tutorial Written by Luciano Iurino

Environment Lighting

This five part series will focus on the topic of setting up a variety of lighting rigs that reflect natural lighting at different times of the day and manmade interior lighting. Each of the chapters will use the same base scene as a starting point, and will show a step by step guide to finding a lighting and rendering solution that best reflects the desired lighting situation.

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CHAPTER 2 - BROAD DAYLIGHT

Software Used: Maya and Mental Ray

Welcome to the second part of the Interior Lighting Tutorial. This time we'll be creating a daylight rig for our 3D room.

Let's start by opening the Daylight_START.mb file. The scene is pretty much the same as for the first part (**Fig.01**).

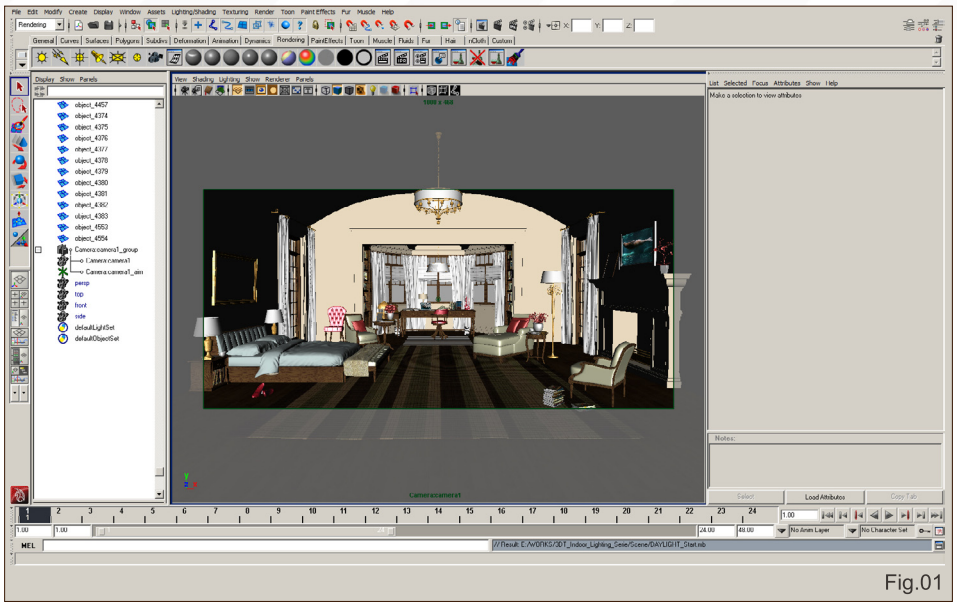
Fig.01

Before we can actually start lighting the room, we need to change the rendering engine to Mental Ray. Open the Render Settings panel and in the Render Using menu click on Mental Ray (**Fig.02**).

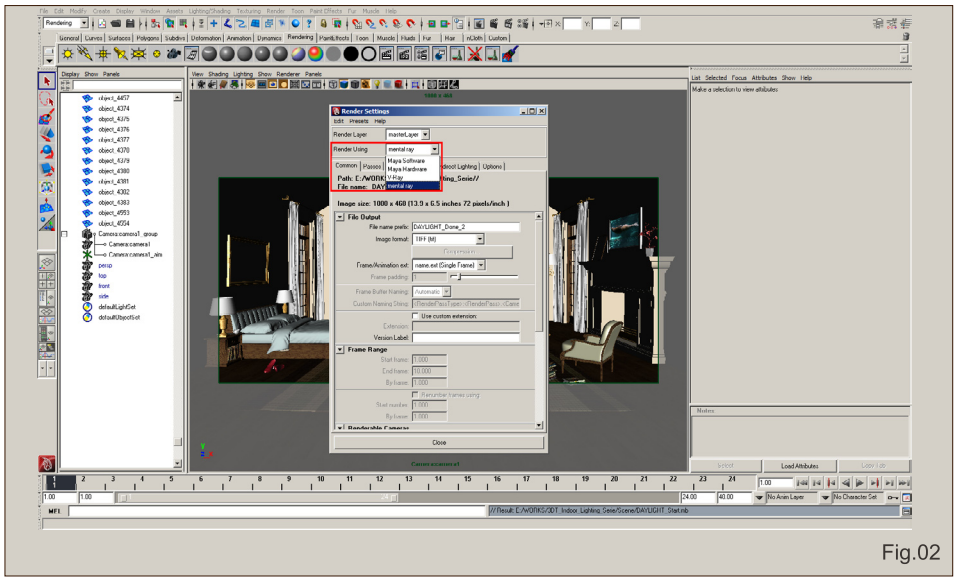
Fig.02

The first thing we need to do is to create our main light source (the Sun), so switch to the Indirect Lighting tab in the Render Settings panel and click on the Create button next to Physical Sun and Sky (**Fig.03**). This will create a new directional light representing our sun at the origin of the scene. The light icon may be too small, so just select it and make it bigger to see it better. The only thing that really matters about this directional light is its orientation, since it represents the sun. So try not to rotate it too much, or it will light the scene like the sun at sunset; just try to keep it almost perpedicular to the ground.

If you open the Render View and do a quick test render, you'll notice that the Physical Sun and Sky has already activated all the necessary features to illuminate the room: it created an environment for us and activated the Final Gather. There is a strong cold color component because of the blue sky in the environment and a pale warm light coming through the right window (**Fig.04**).

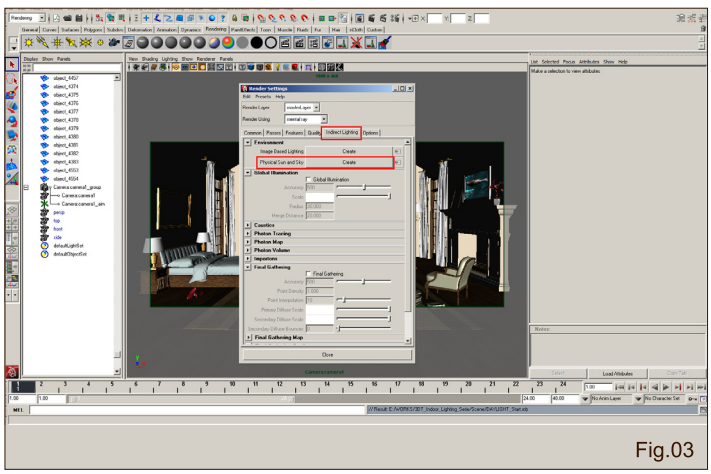
Fig.03

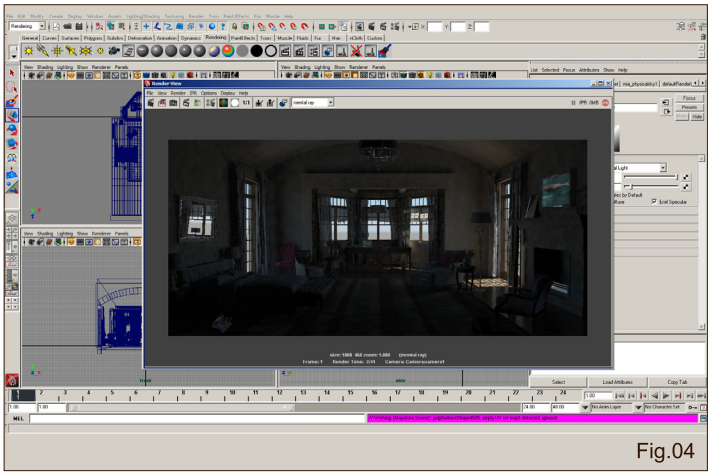
Fig.04

Let's start changing the Physical Sky parameters to get more light into the room. Set the Multiplier value to 3 and the Horizon Height to about -0.5. The room looks brighter now, but it's still too dark (**Fig.05**).

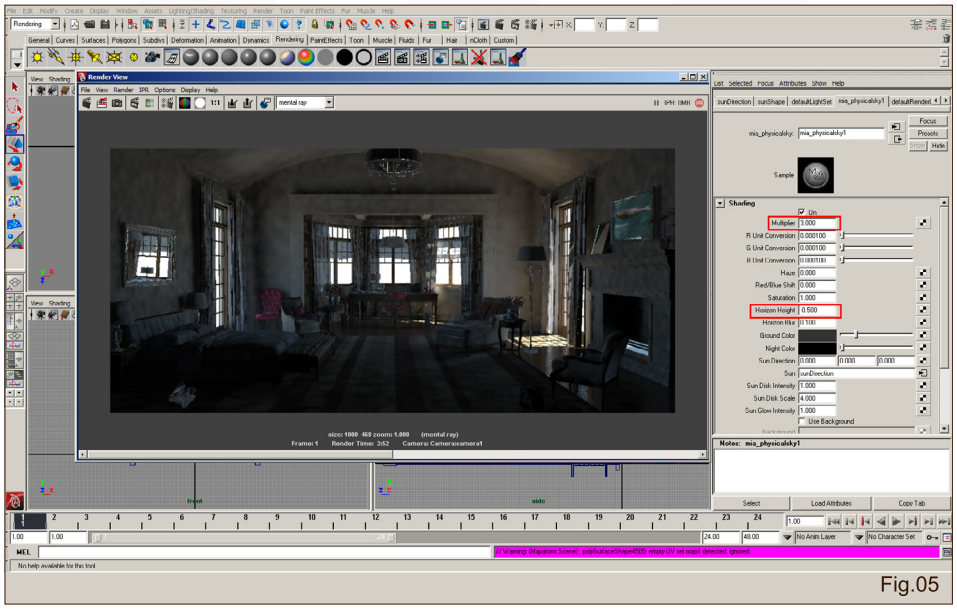
Fig.05

Create a new Area Light and position/scale it as shown in (**Fig.06**). It has to be close to the right window and pointing inward. Make sure it's not touching the window's mesh.

We'll use this Area light to shoot GI photons inside the room, so we don't really need it to act as a "normal" light. Set it's Intensity down to 0 and make sure that it emits photons in the Mental Ray > Caustic and Global Illumination tab (**Fig.07**).

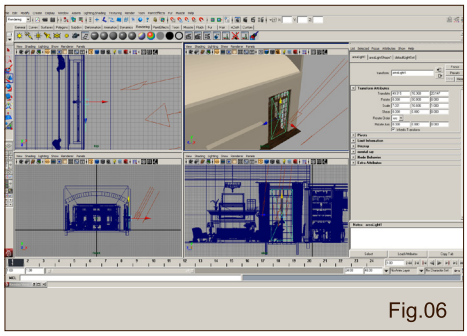
Fig.06

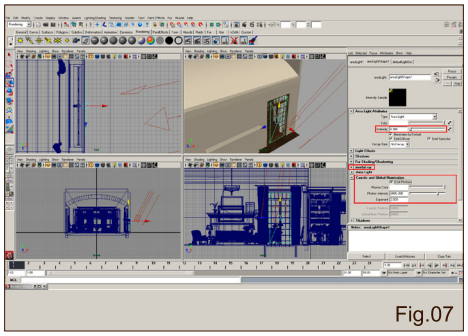
Fig.07

Open the Render Settings panel and switch to the Indirect Lighting tab. In the Global Illumination section, make sure that Global Illumination is active (**Fig.08**).

If you do another quick render, you'll notice no changes at all. That's because the Area light

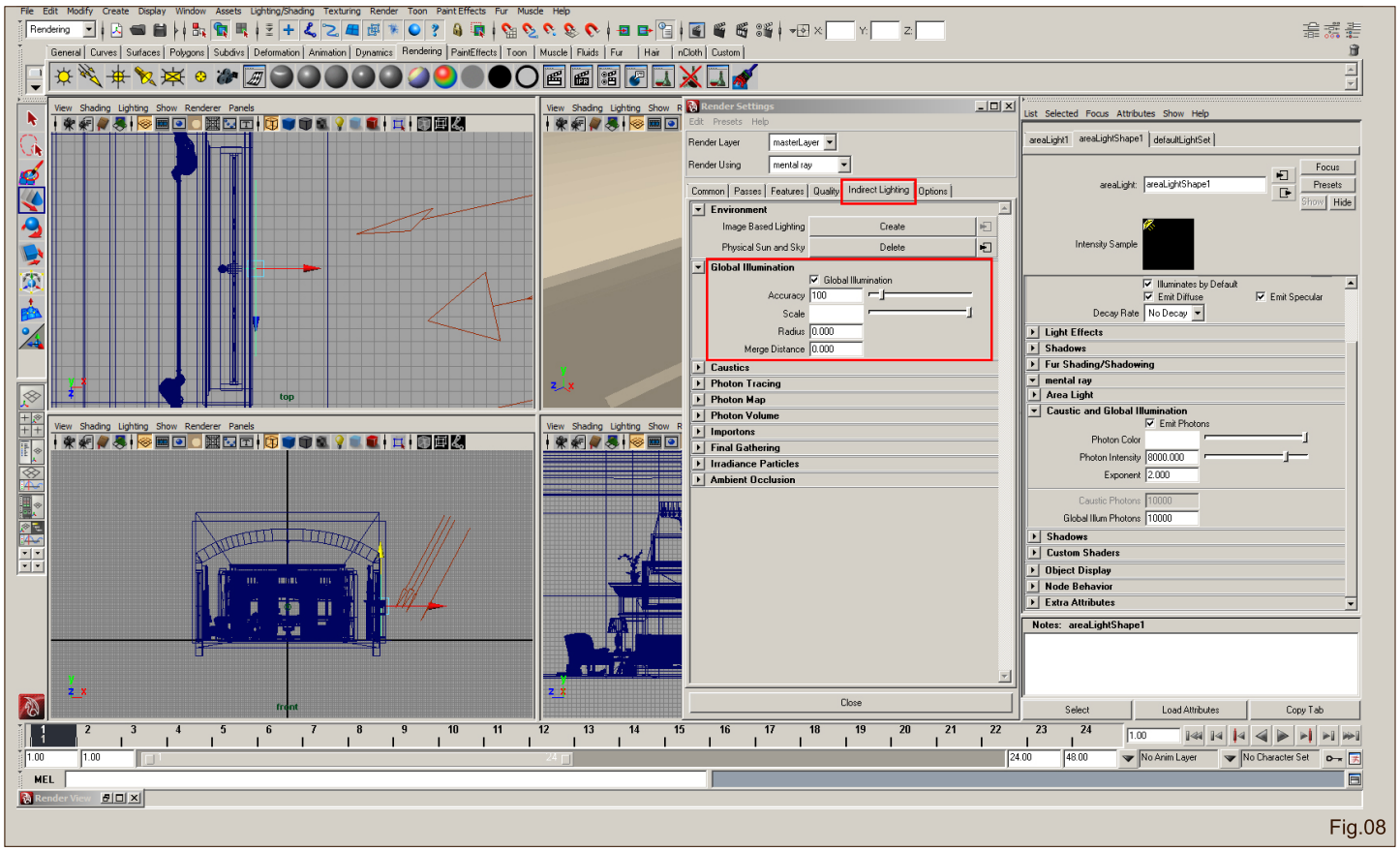
Fig.08

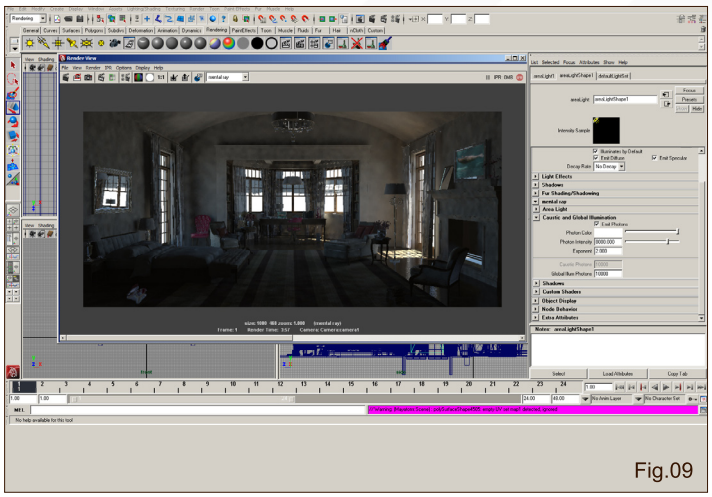
Fig.09

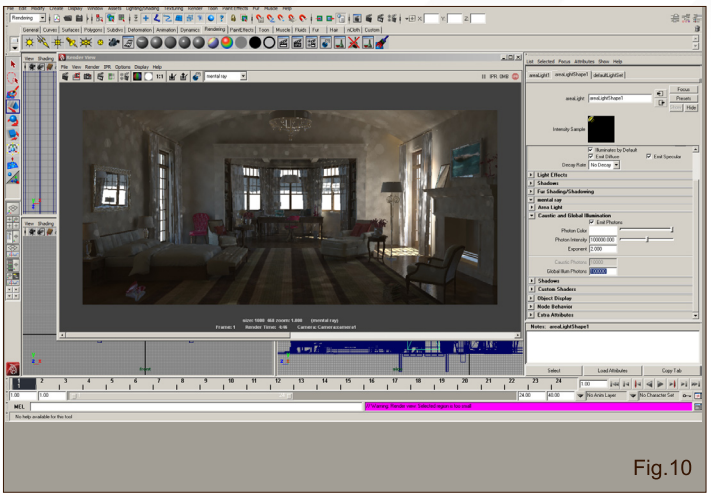
Fig.10

photons' intentisy is not strong enough with the default values (**Fig.09**).

Increase the Photon Intensity value to 100.000 and the Global Illum Photons to 100.000 (**Fig.10**). Now we start to see more light into the room, and we also see some spots all over the walls and objects: those are the photons emitted from the Area light. Don't worry about that at this stage, we'll take care of it later.

Duplicate the Area light and rotate/position it on the opposite window (the left side one) (**Fig.11**).

Create another copy of the Area light, but this time position/rotate it near one of the windows in the back of the room (**Fig.12**). Now we have a total of three Area lights shooting photons inside the room.

Let's do another quick render in the Render View and let's see what happens. Now there is a lot of light inside the room, and a lot of photons all over the place (**Fig.13**).

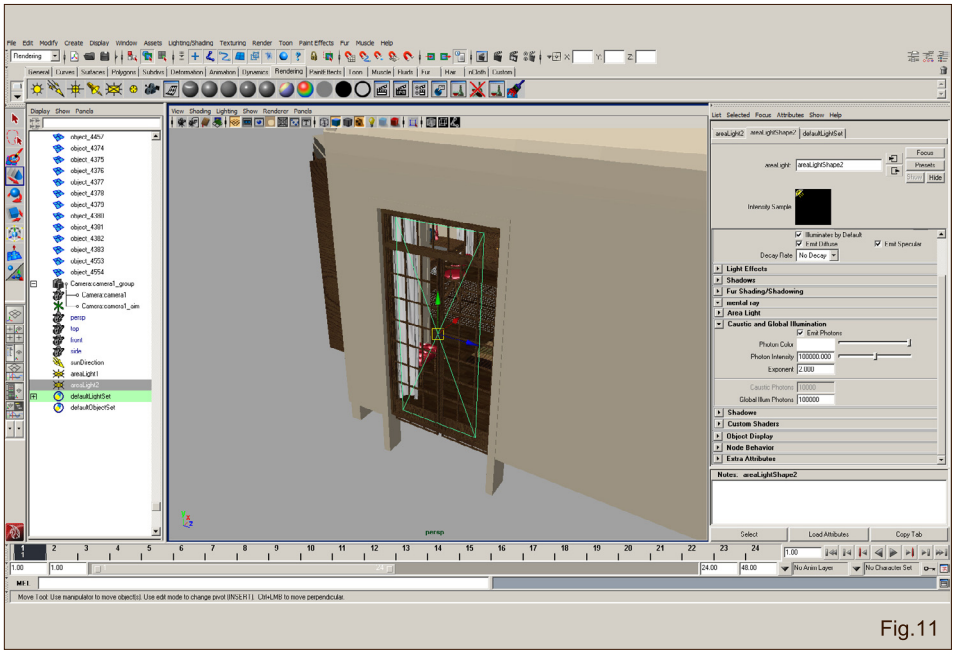
Fig.11

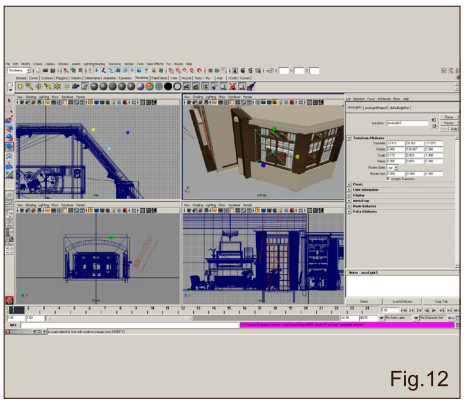
Fig.12

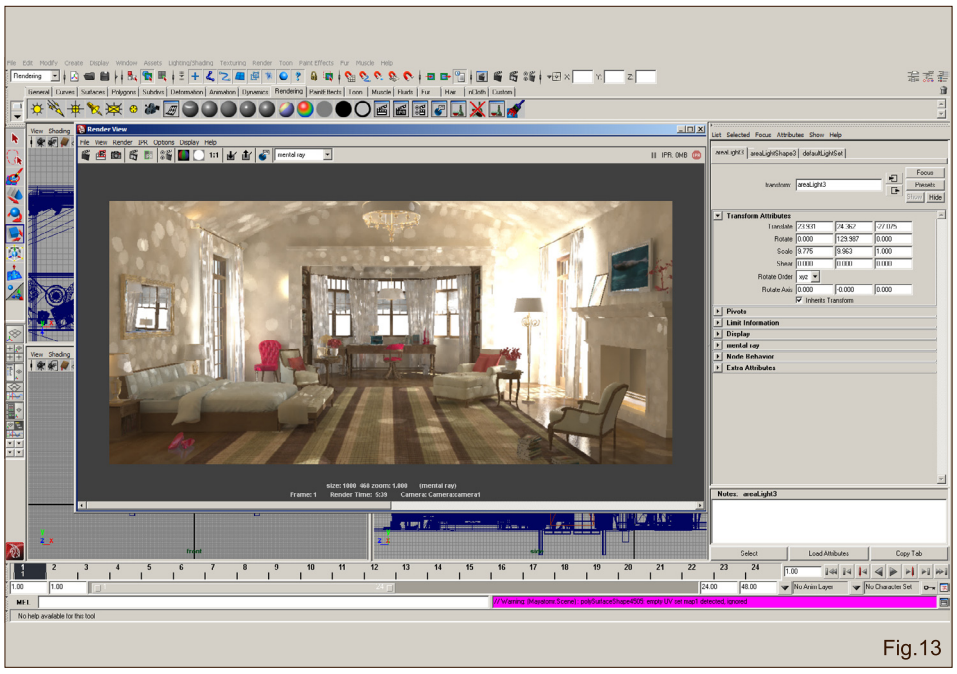
Fig.13

Now that we've set up the desired amount of light for the scene, we need to use some kind of exposure control to avoid over-exposed and burned areas in the rendered picture. Open the Hypershade and select the Camera we're using for the rendering. Drag it into the Work Area and connect a mia_exposure_photographic node to it (**Fig.14**).

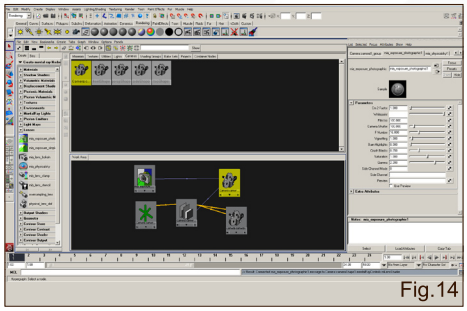
Fig.14

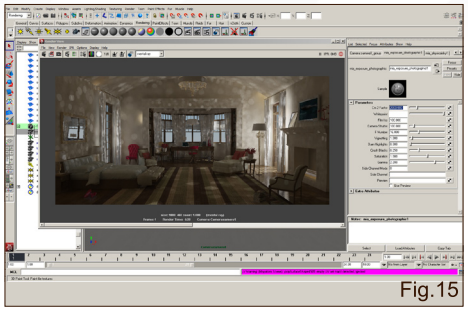
Fig.15

We can now control the exposure of the picture just like a photographer would do with a professional camera. Change the Cm 2 Factor parameter to 2000 (**Fig.15**).

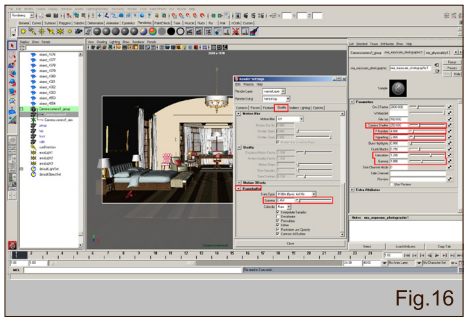
Fig.16

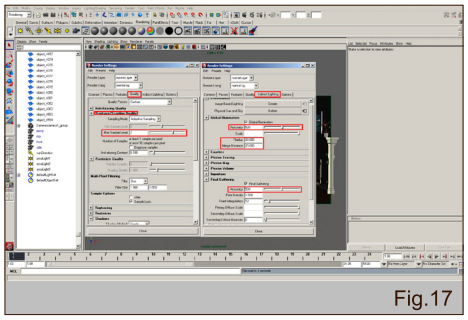
Fig.17

Open the Render Settings panel, and reach the Frame Buffer section in the Quality tab. Set the Gamma value to 0.454. Go back to the mia_exposure_photographic node and set the Camera Shutter to 250, the F Number to 4, the Vignetting to about 2 and the Saturation to 1.2. (**Fig.16**). Try to play with these parameter to get the right exposure and look for your picture.


Fig.18

Once you're happy with the result, you can set the parameters for the final rendering. In the Quality tab, set the Max Sample Level to at least 2 (it's a good compromise between anti-aliasing quality and render times). In the Indirect Illumination tab, set the Accuracy for both Global Illumination and Final Gather to 500. Also, set the Radius value to 30 and the Merge Distance to 20. This sould take care of the spots problem (**Fig.17**).

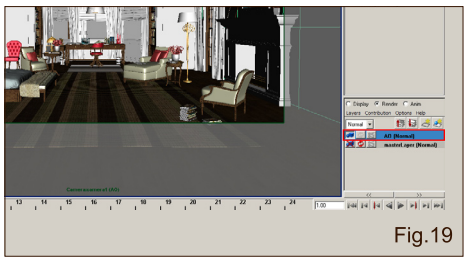
Fig.19

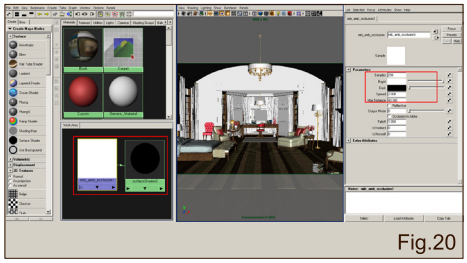
Fig.20

Set the desired image resolution and Batch Render the scene. Don't forget to save the alpha channel along with the final picture. You can use a file format like .TGA, for example. In **Fig.18** you can see the final color pass.


Fig.21

As usual, we also need an Ambient Occlusion pass for the compositing. Create a new Render Layer and call it AO (**Fig.19**).

Open the Hypershade and create a new Surface Shader material. Connect a mib_amb_occlusion node to it's color value and set the Samples to 256, the Spread to about 2 and the Max Distance to 40. (**Fig.20**)

Assign this shader as an override material for the rendering pass, and Batch Render the scene again. In **Fig.21** you can see the final Ambient Occlusion pass.

Open the AO pass picture in Photoshop and paste it over the color pass. Set the AO layer blending mode to Soft Light and try to play with the Levels to get the desired amount of detail (**Fig.22**).

Flatten the two layers together, and import a background picture like the one shown in **Fig.23**. Since we saved the rendered picture with the alpha channel, we just need to put the background layer below the main layer.

Fig.24 shows the final composited picture.

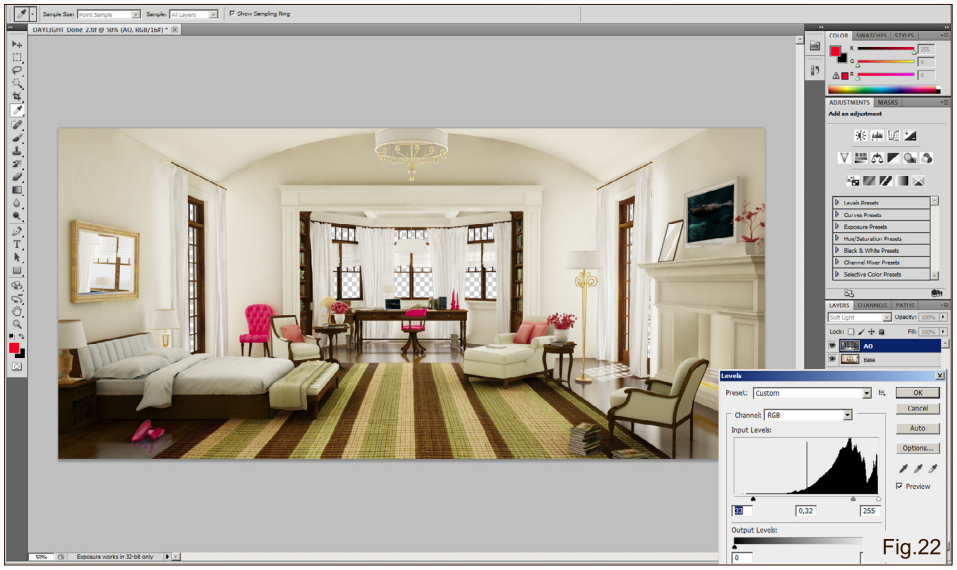
Fig.22

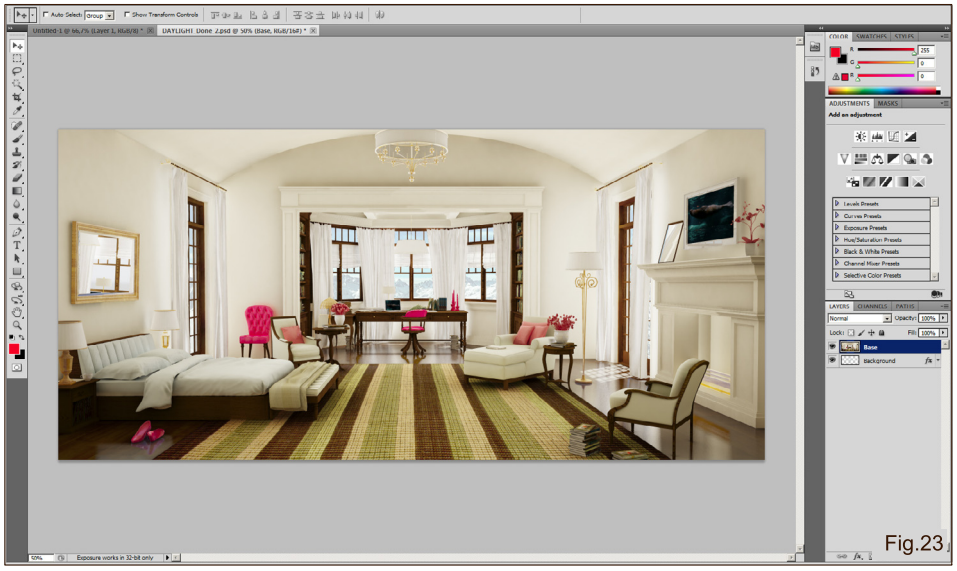
Fig.23

Scene Created by:
VIKTOR FRETYÁN

Textures Supplied by:
3DTOTAL TOTAL TEXTURES

Tutorial by:
LUCIANO IURINO

For more from this artist visit:
http://www.pmstudios.it
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Fig.24

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Scene Created by: Viktor Fretyán | Tutorial Written by Fredi Voß

Environment Lighting

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CHAPTER 2 - BROAD DAYLIGHT

Software Used: Cinema 4D 11.5

INTRODUCTION:

Hello and welcome to the second part of the Indoor Lighting series.

The features used here are part of the Advanced Render in Cinema 4D 11.5. Some elements could possibly be reproduced in earlier versions of C4D, but in the earlier releases of Cinema 4D the Global Illumination feature is founded on completely different algorithms. So the results and settings might not work out exactly the same.

On a technical point, the memory footprints when rendering this scene might be quiet big so the usage of a 64 bit OS is recommended. The render performance is strongly dependent on the power of your hardware, so give yourself some time for rendering the final results. So let's start.

RENDER SETTINGS

For the final rendering I used a width of 1600 pixels. This gives us good definition of the small details which are part of this scene. The anti-aliasing is set to Best. For the work in progress images you can also use None or Geometry. Using the Multipass option for the final render might give you the opportunity to get the best result for your final image.

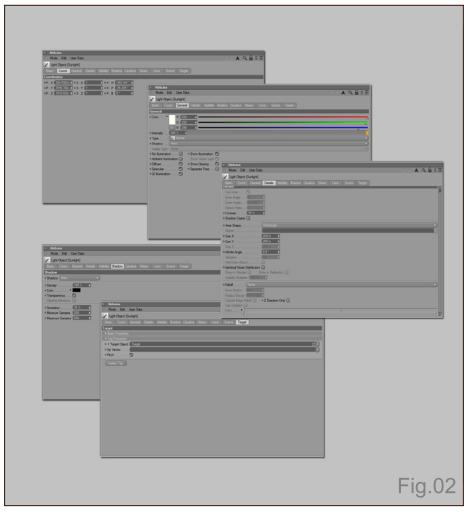
Fig.02

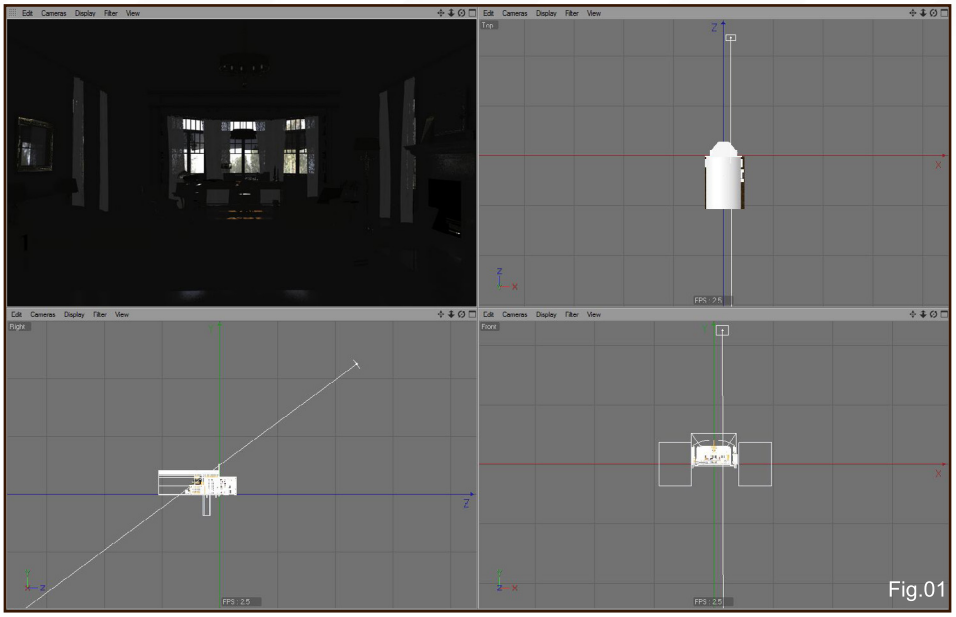
Fig.01

When we experience broad daylight we witness a quiet neutral color tone produced by the Sun. The Sun is settled at a high altitude, almost in direct opposition to the camera. In contrast to the first part of the series (sunrise) the influence of the light works in a less direct way - this is because of the position of the Sun. The amount of indirectly illuminated areas is much higher than at sunrise, as the Sun cannot get through the windows directly.

For the lighting setup I'm using conventional light sources and Global Illumination, which is going to play an important role here. So let's have a look at the structure of the setup.

SUNLIGHT

I have one light source which I call "Sunlight". When looking at the editor screen it appears that this light source might not produce any effect at all, but in combination with the Global Illumination we get the effect we require. It is very strong with a slight yellowish color and the contrast is quite high. Whilst making this tutorial I tried the light in different positions to reflect different sources. To do that in an easy way I used a target tag focused on a separate light target (**Fig.01 – 03**).

SECONDARY LIGHTS

The secondary light gives us the ability to have more light in the area you can see in the editor shot. If we were to only use the primary sunlight, we would have to increase the sample levels much higher. This would have a negative effect on the performance later on, so this is a quite handy and effective work around.

If you watch the editor shots of the four lights very closely you might only see a small effect, but don´t worry about that. When they are

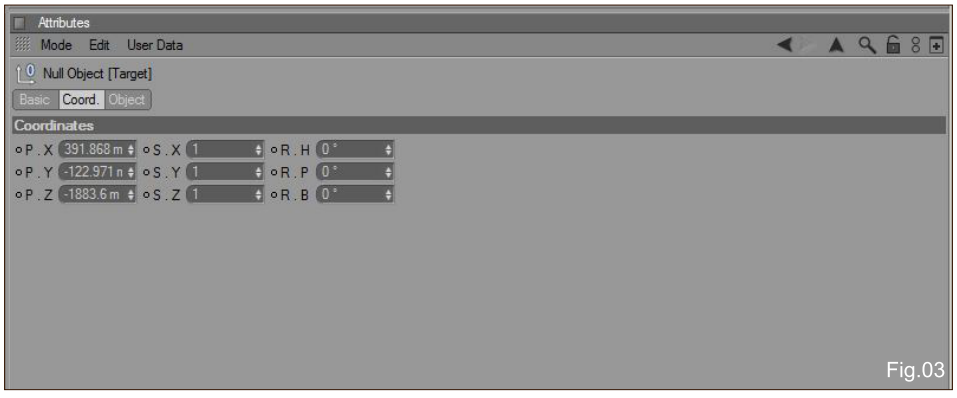

Fig.03

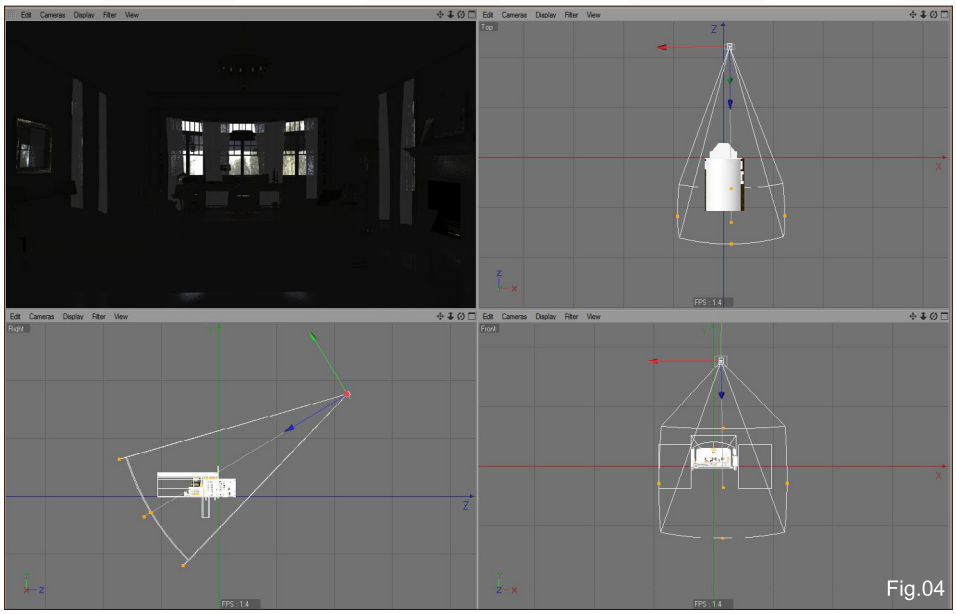
Fig.04

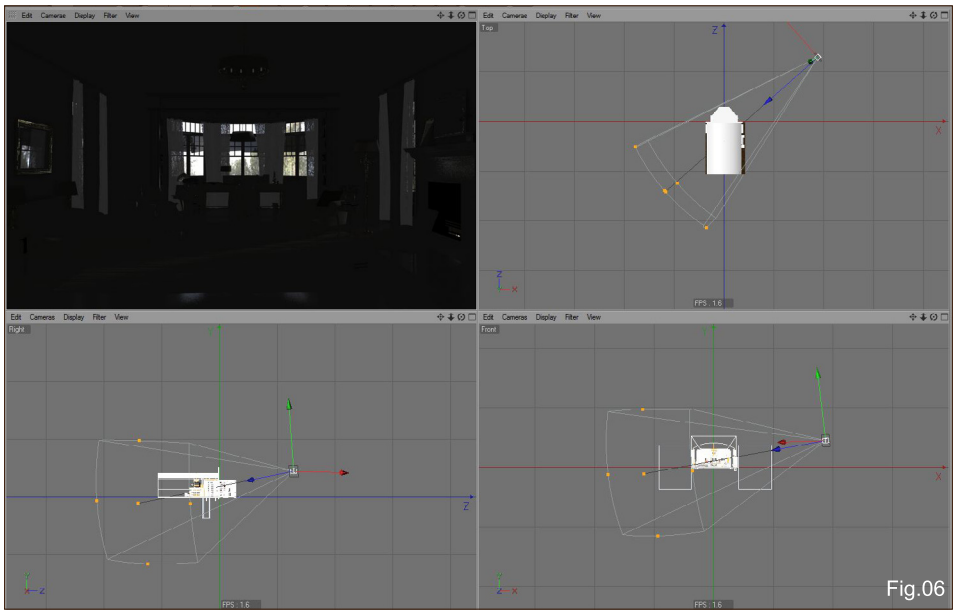
Fig.06

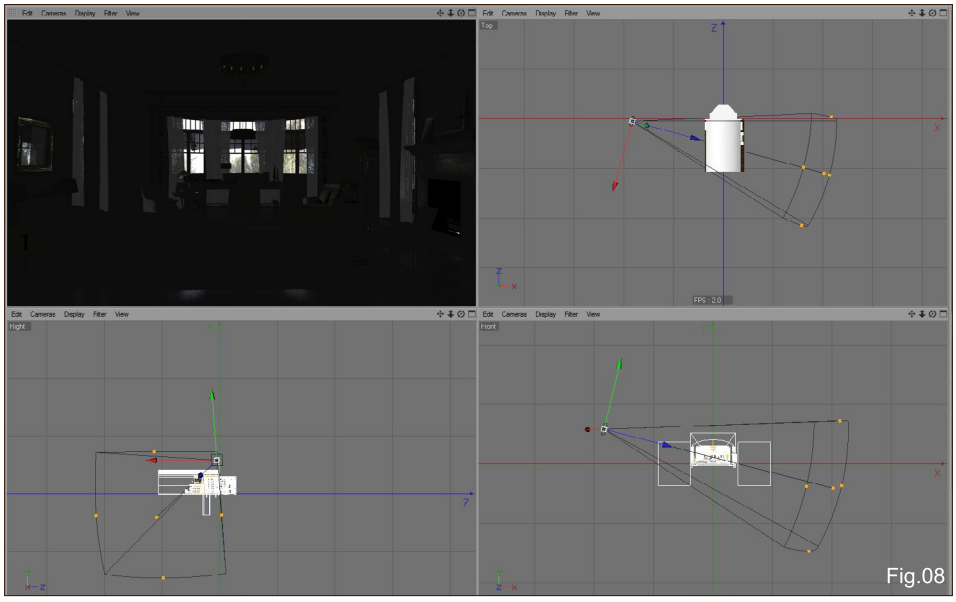
Fig.08

combined with Global Illumination they will work in the way we want them to. In reality the whole sky works as a kind of huge light source. You, of course, have the main direction of the sun, but at the same time you also have light from an infinite amount of directions reflected from the landscape and other objects outside of the windows. These are the four secondary lights that I set up (**Fig.04** – **11**).

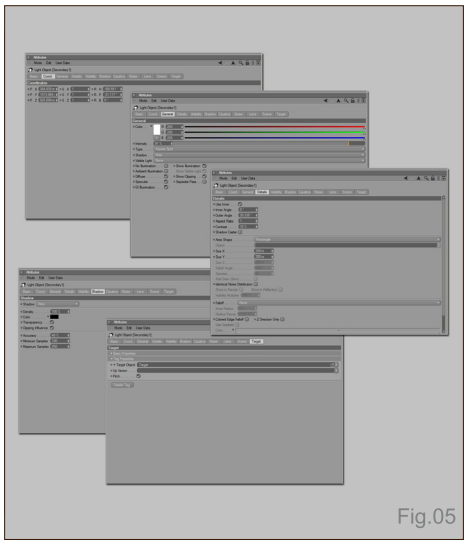
Fig.05

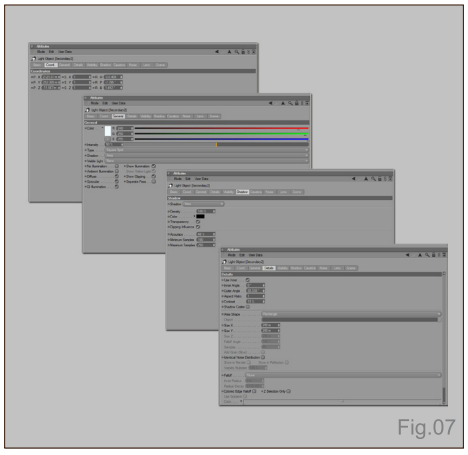
Fig.07

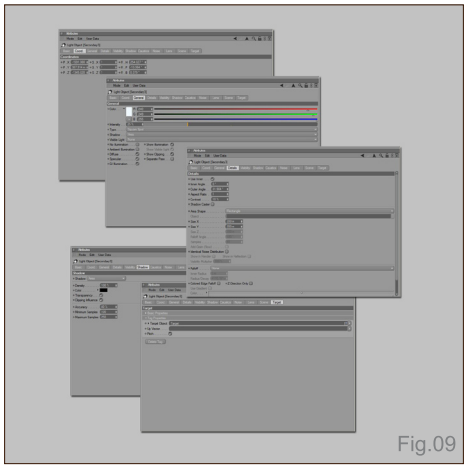
Fig.09

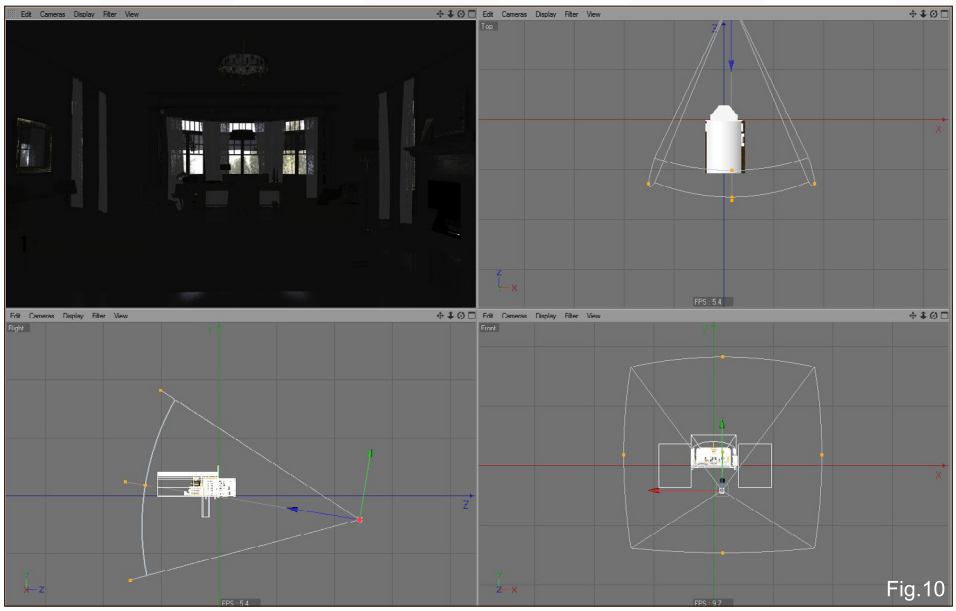
Fig.10

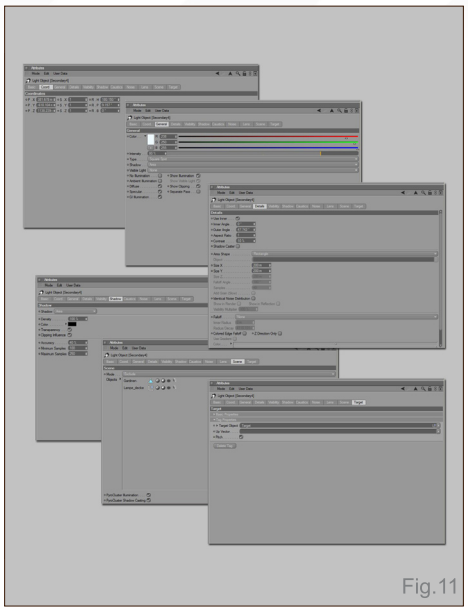
Fig.11

The combination of the sunlight and the four secondary lights might now look like this… not very impressive (**Fig.12**).

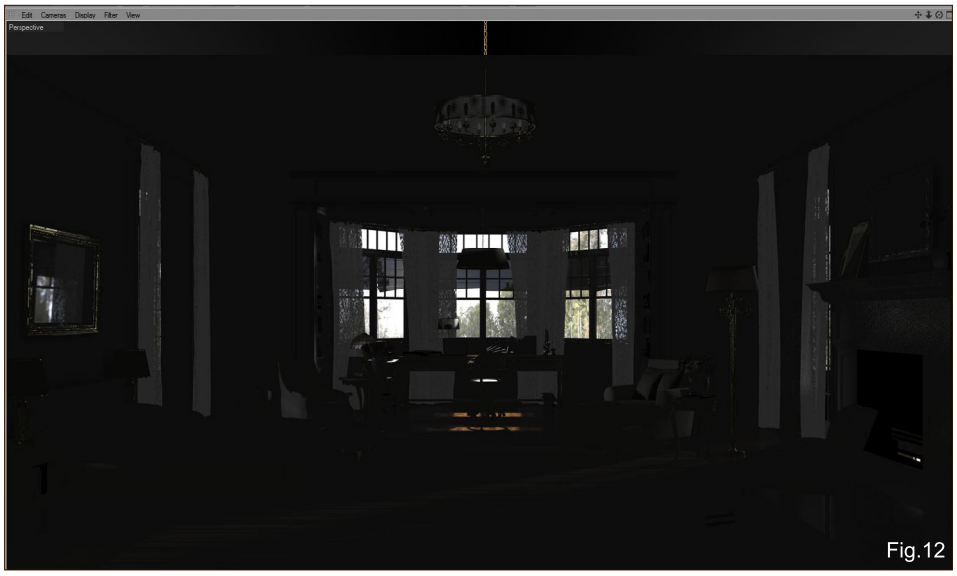
Fig.12

Effect Lights

In order to get more definition on certain objects I used two other light sources which I called "Effect 1" and "Effect 2". Again exclusions do a good job here. These two lights are not used for general illumination, but for making some "hotspots" on the surfaces of the objects inside the room. They define specularity and reflections in a more intensive way. The three dimensional appearance of the scene is increased and it looks less boring (**Fig.13 – 16**).

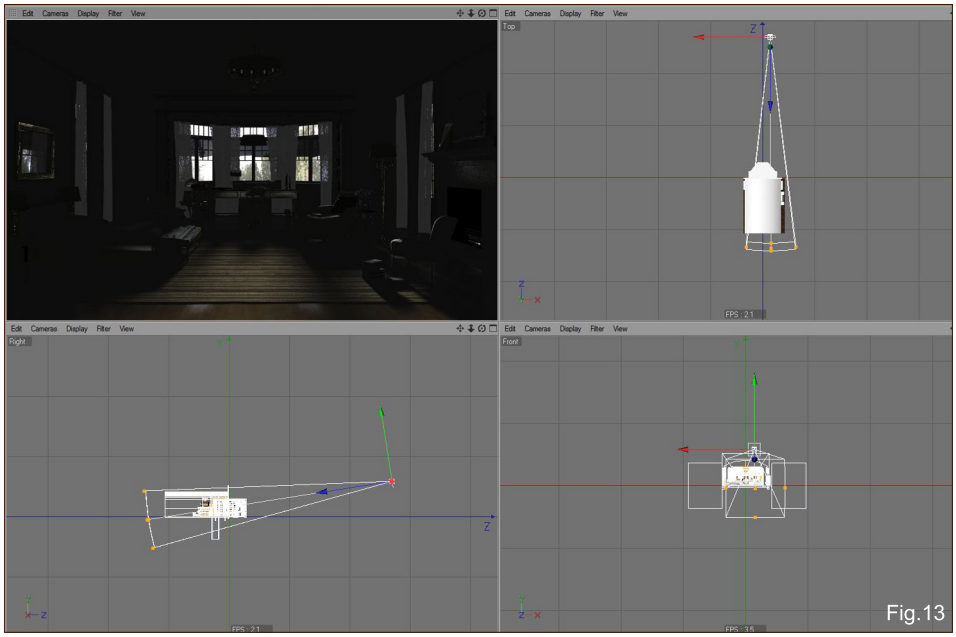
Fig.13

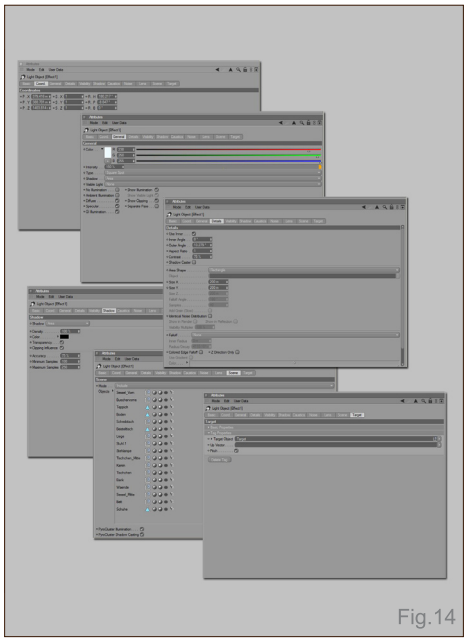
Fig.14

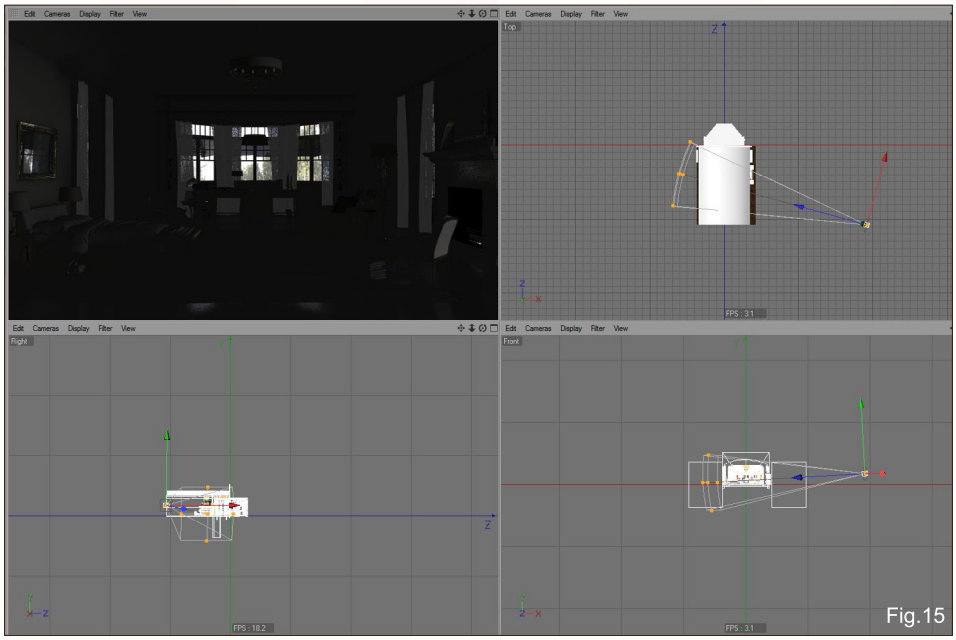
Fig.15

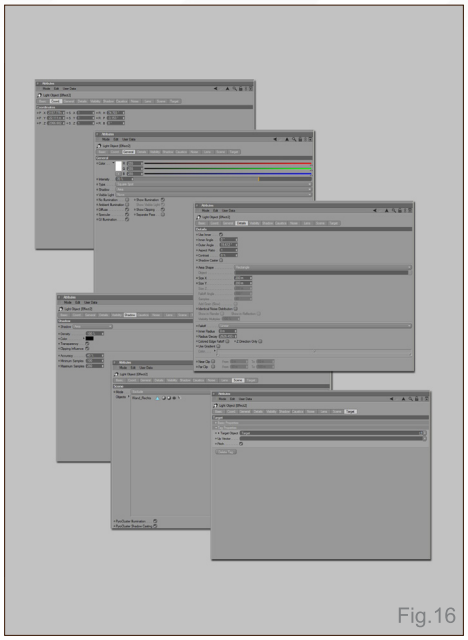
Fig.16

Now it is time to have a look what we have so far (**Fig.17**)

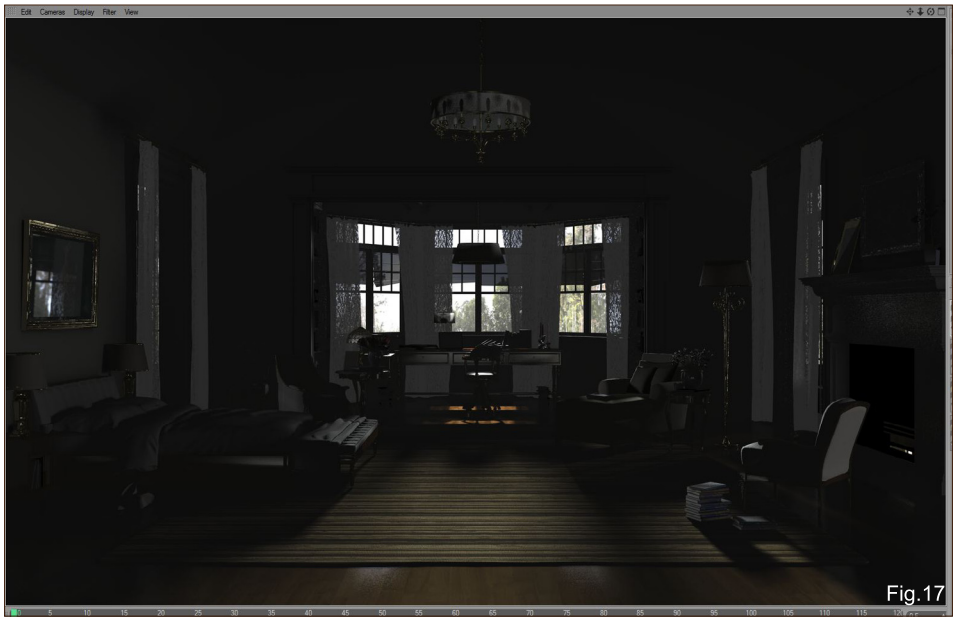
Fig.17

Reflectors

As we want to use GI here we can define the objects which I called “reflectors”. I placed two next to the windows outside and one inside the room. This helps to simulate the light bounced from the walls. In Advanced Render 3 this kind of object with a luminance material can be defined as a light source. They produce a very smooth light. Using compositing tags prevents them from dropping shadows themselves, which we do not want in this case. So the shadow dropping of the other lights is not influenced. You can find these items in the scene file.

Global illumination

Now it is time to get the rest of the illumination by GI.

To achieve the desired effect I used a diffuse depth of two with a primary intensity of 150% and a secondary of 75%. The final quality settings are at a higher level in order to prevent any artifacts on the smooth surfaces of the walls. For a quicker preview you can set them to preview level. The render using these parameters shows that we have a large amount of artefacts, but it is a handy feature to get an impression of the final render (**Fig.18**).

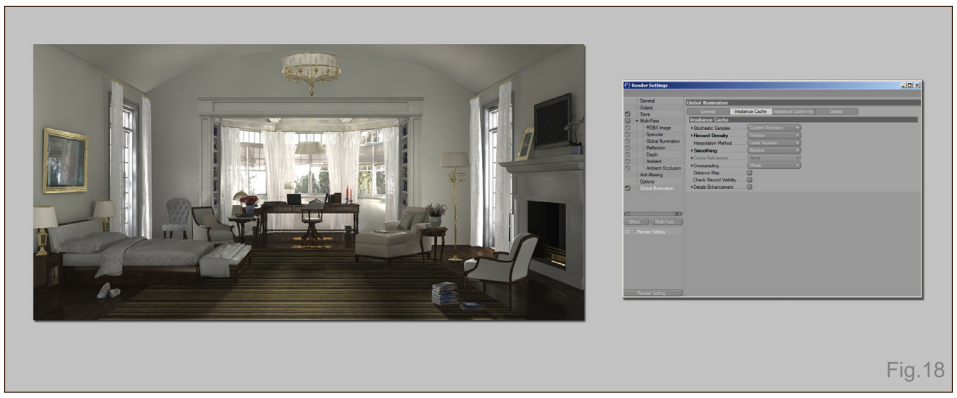
Fig.18

In **Fig.19** you can see the final settings for the global illumination parameters. The render of the GI-pass without any additional light sources shows how big the influence of the global illumination is. All the light in this image is coming from the HDRI which is used to get nice reflections on the surfaces.

Final Rendering

The final image was edited in Photoshop for a quick fine tuning. The multipass option delivers channels like the depth channel and the reflection pass separately, but there are a lot of options to create a satisfying result.

As I said before it takes some time to get a good render. So the best thing to do is to leave your computer working over night, but for serious render fans this is a usual. If you experience problems with the performance of your machine you can try to lower the resolution of the render or reduce the quality settings for the GI (**Fig.20**).

So have fun and good bye for now, Fredi.

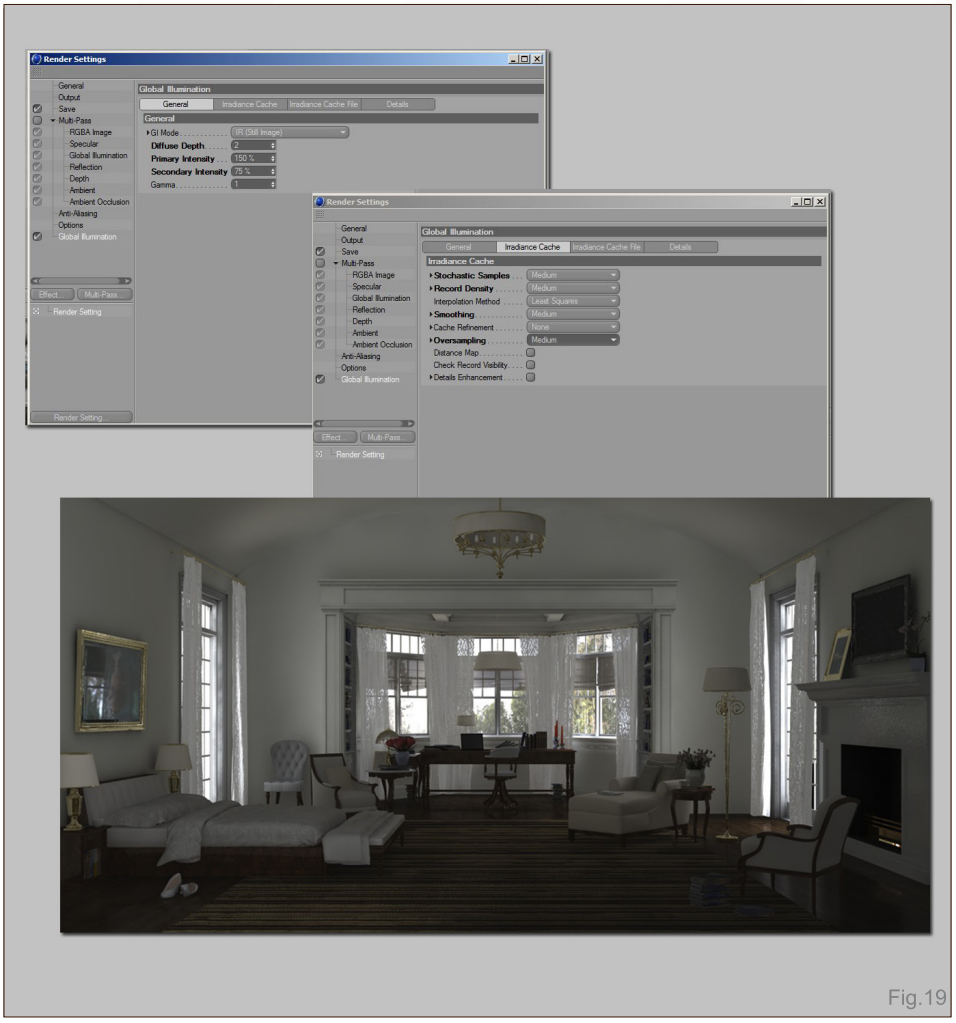

Fig.19

Scene Created by:
Viktor Fretyán

Textures Supplied by:
3DTotal Total Textures

Tutorial by:
Fredi Voss

For more from this artist visit:
http://fredivoss.cgsociety.org/gallery/
Or contact them:
vuuxx@gmx.de

DOWNLOAD RESOURCES

- Free Scene & Textures
This download includes the artist final scene set up + textures

Fig.20

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